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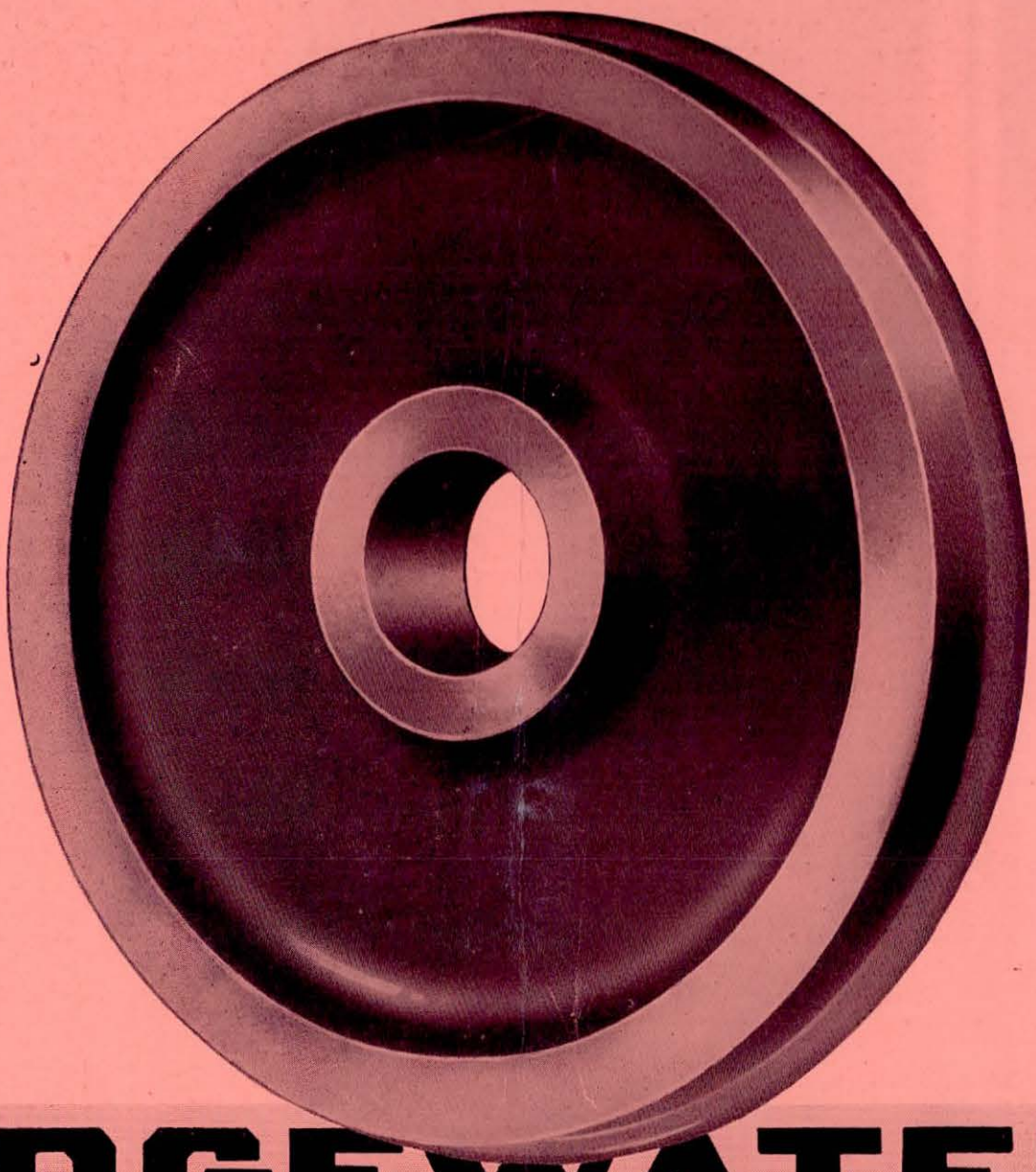

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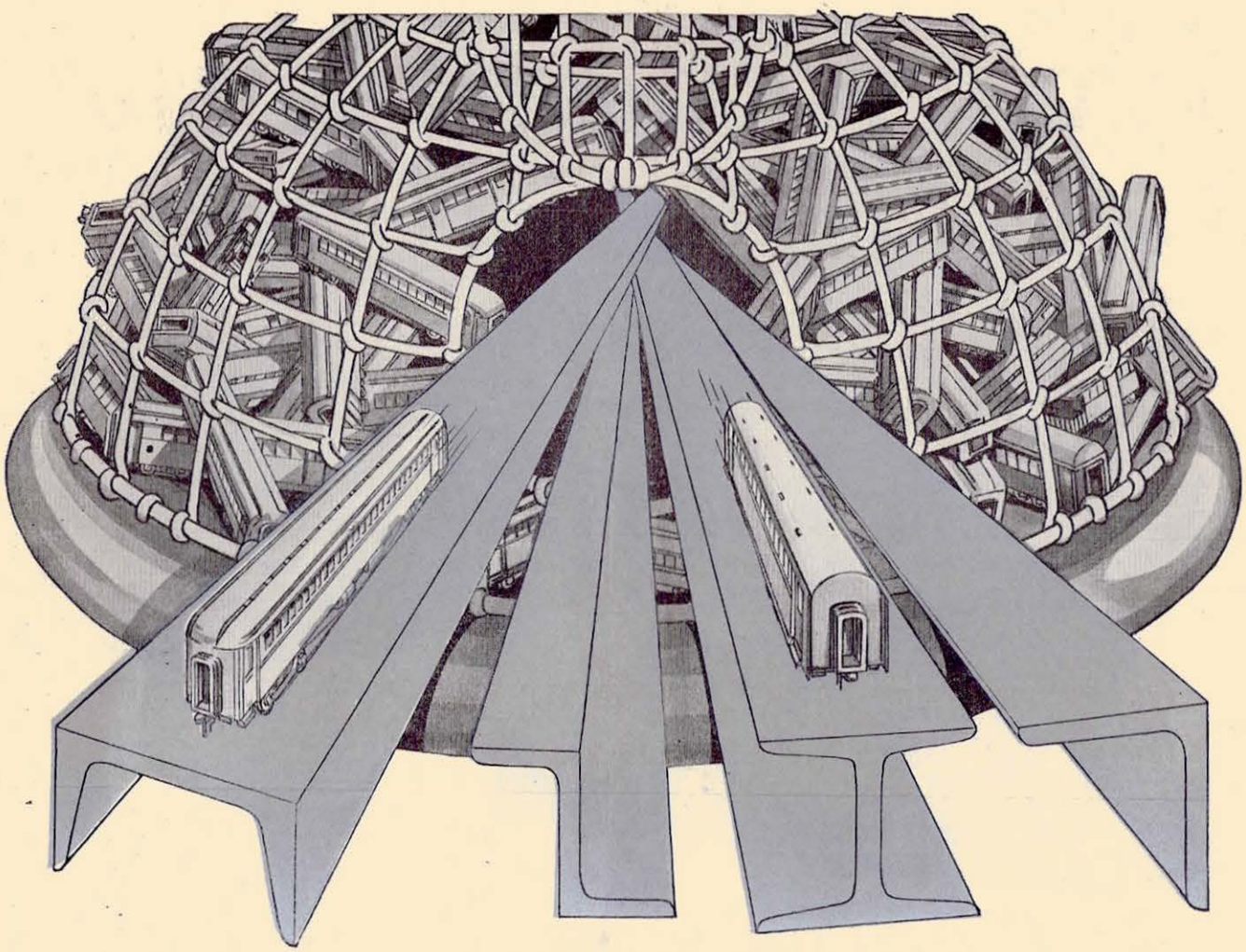

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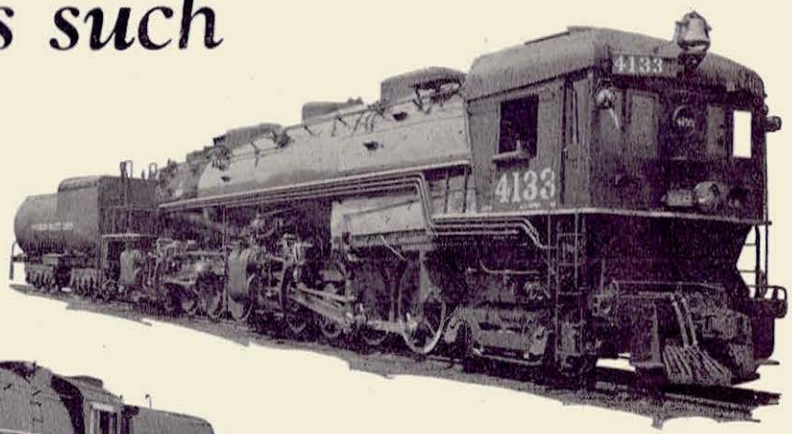

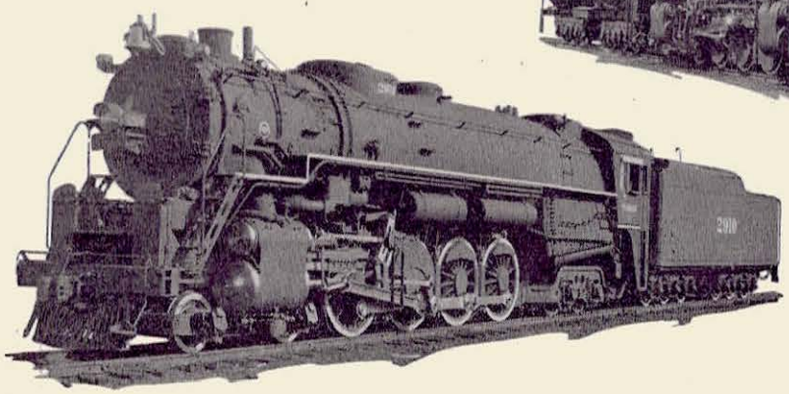

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name Registered U. S. Patent Office

Vol. 91 July 4, 1931 No. 1

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A description of an oil-electric locomotive built by the Baldwin Locomotive Works, powered by a 1,000-hp. Krupp Diesel engine, having all weight on drivers, and developing 67,500 lb. tractive force.

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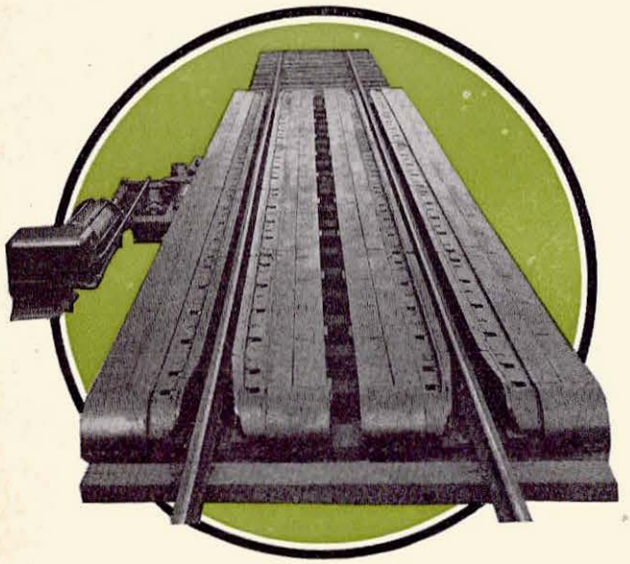
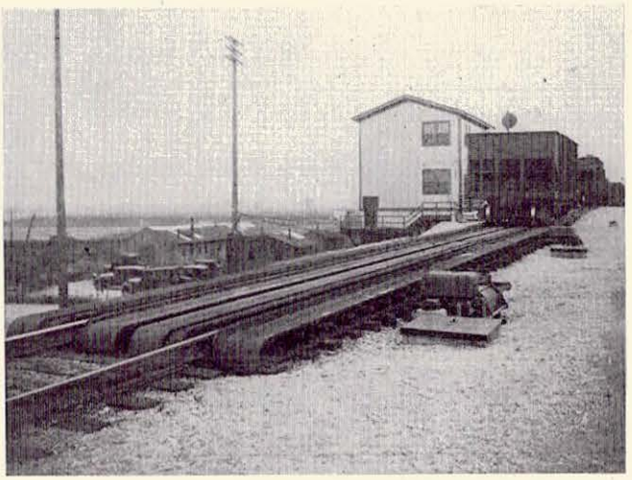
30c a Car

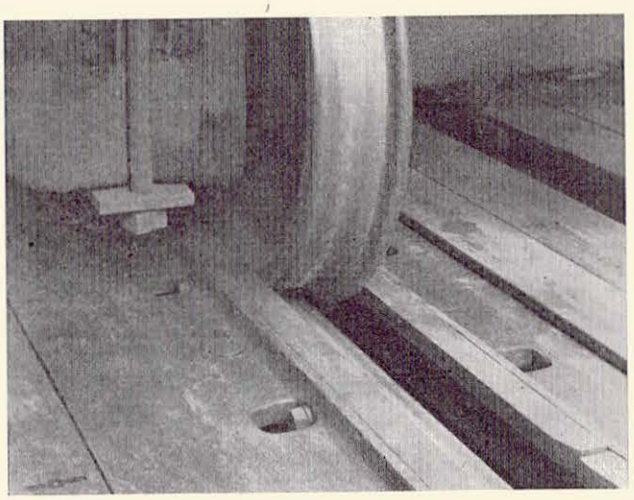
Saved in Yard Costs

District Offices:

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO







In July, 1929, the Big Four placed in service an installation of "Union" Electro-Pneumatic Car Retarders in its Sharonville, Ohio classification yard. The yard has 30 tracks with a capacity of 1654 cars, designed for future expansion to 1744 cars.*

Average cost of fuel, wages and other operating charges for handling each car has been reduced from 47.9c to 17.2c or 64.1 per cent. Manifest freight traffic is being delivered to Cincinnati on an average of 1½ hours quicker than previously. An average of 54 minutes is saved on each car classified. Operating costs of the yard with "Union" Car Retarders show a saving of about $102,779 a year, or nearly 20 per cent on the investment. It is anticipated that considerable classification being done in other yards, when done in the Sharonville yard, will increase the return on the investment to 40 per cent.*

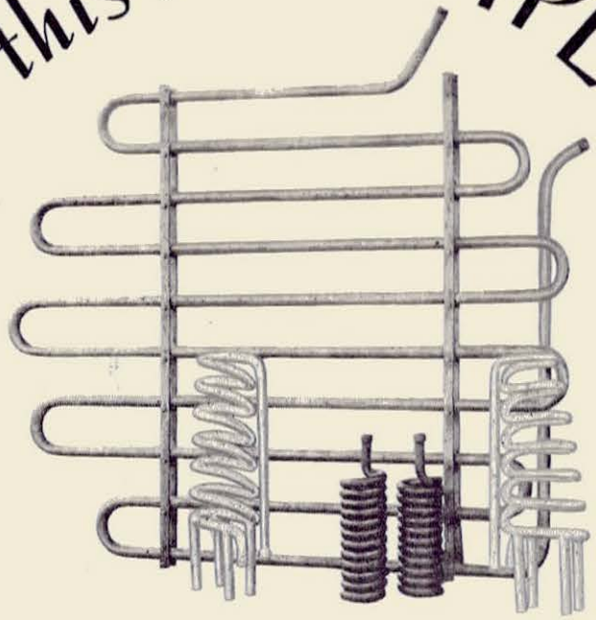
Our nearest district office will be glad to discuss the economic possibilities of Car Retarders on your property.

* From an article in the December, 1929 issue of Railway Signaling.

1881 Union Switch & Signal Co. 1931

SWISSVALE, PA.

this NEW PIPE* takes good bends- because it GIVES



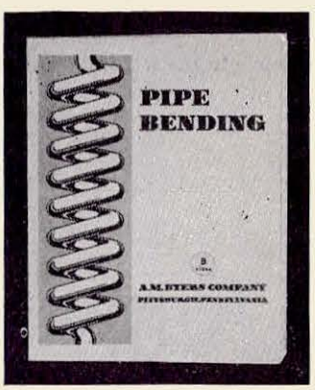
This illustration suggests the class of bends that are commercially made of Byers Bending Pipe. The fact that this pipe is used for the most difficult bends and in the most exacting service, is its strongest recommendation for use in the many different types of bends which you will want to make.

Pipe must *stretch* before it can bend —and Byers Genuine Wrought Iron Bending Pipe has the necessary ductility to permit it. Ductility made possible through extensive research and test, and present in *every piece* of pipe because of the accurate control and the uniform results possible under the Byers method of manufacture.

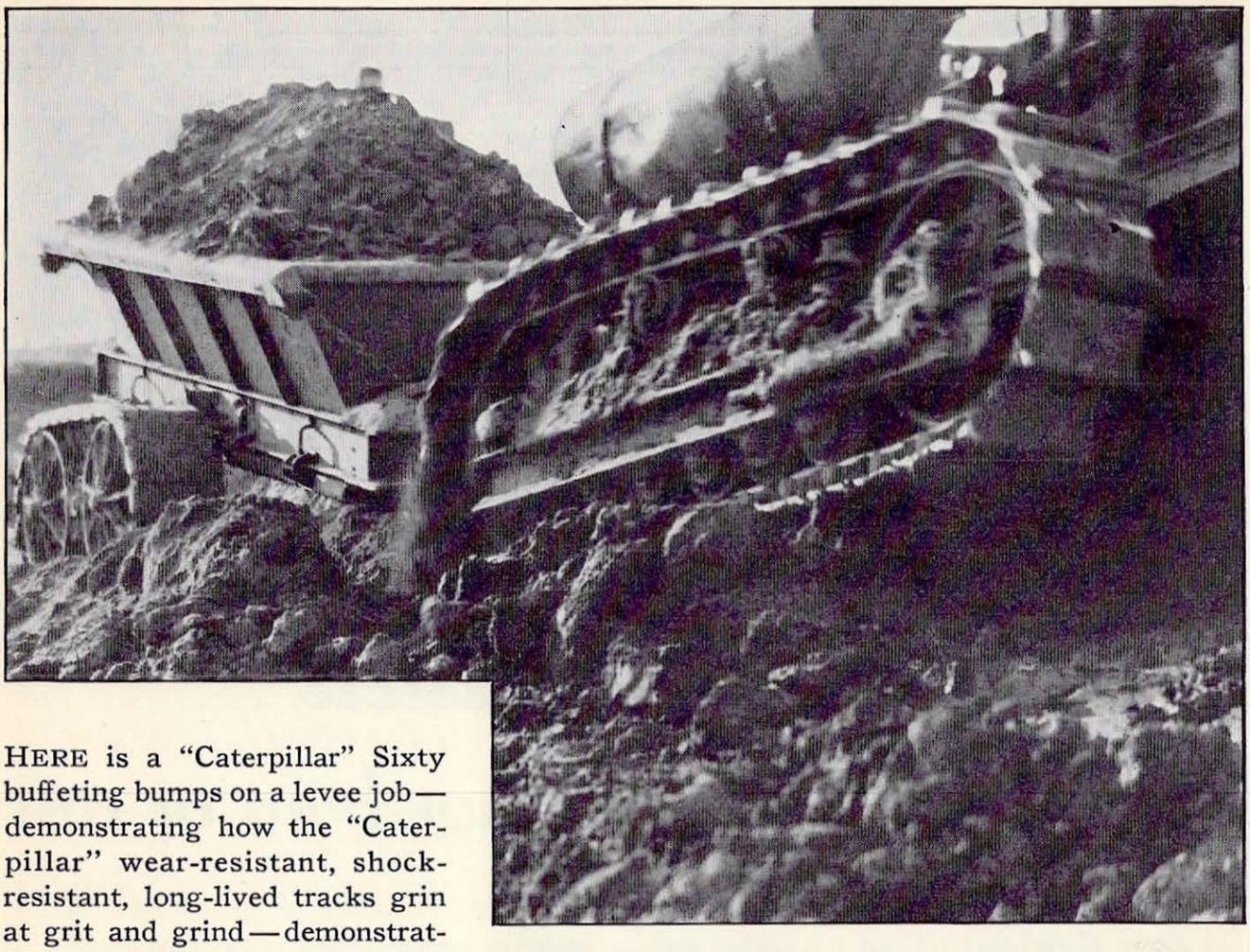
Byers Genuine Wrought Iron Bending Pipe lets you utilize the many advantages that pipe bending gives, lets you enjoy the time-proven advantages for which Byers Pipe is noteworthy. Byers Pipe has always been the choice when service conditions were difficult—the new Byers Genuine Wrought Iron Bending Pipe now fills the need when conditions are difficult—*and bending is necessary.*

A copy of a helpful booklet on pipe bending, and any details you want concerning the new pipe, will be gladly sent you on request. Write A. M. Byers Company, Pittsburgh, Pa. Established 1864.

SEND FOR A COPY



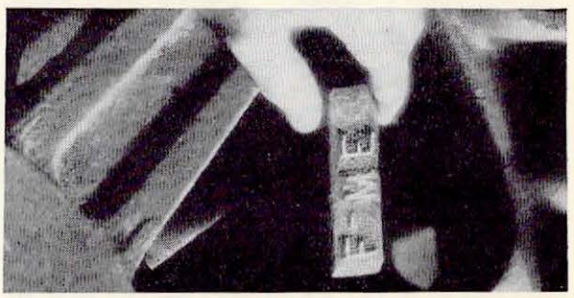
BYERS GENUINE WROUGHT IRON BENDING PIPE



HERE is a "Caterpillar" Sixty buffeting bumps on a levee job—demonstrating how the "Caterpillar" wear-resistant, shock-resistant, long-lived tracks grin at grit and grind—demonstrating how the heat-treated steels of the "Caterpillar" Tractor insure long life for wearing parts.

It is scientific, carefully controlled heat-treating of links, pins, gears and other parts that armors this tractor against shock and wear—that enables the "Caterpillar" owner to tackle his jobs with an assurance of uninterrupted service and timely completion—that guarantees to the "Caterpillar" purchaser highest returns on tractor investments—that adds to the eventual turn-in value of the "Caterpillar" track-type Tractors.

TOUGHENED TO TAKE THE JOLTS



An extra test lug *is cast on final drive sprockets. "Caterpillar" metallurgists break these off and carefully examine them before accepting the sprockets.*

Caterpillar Tractor Co.

PEORIA, ILLINOIS, U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

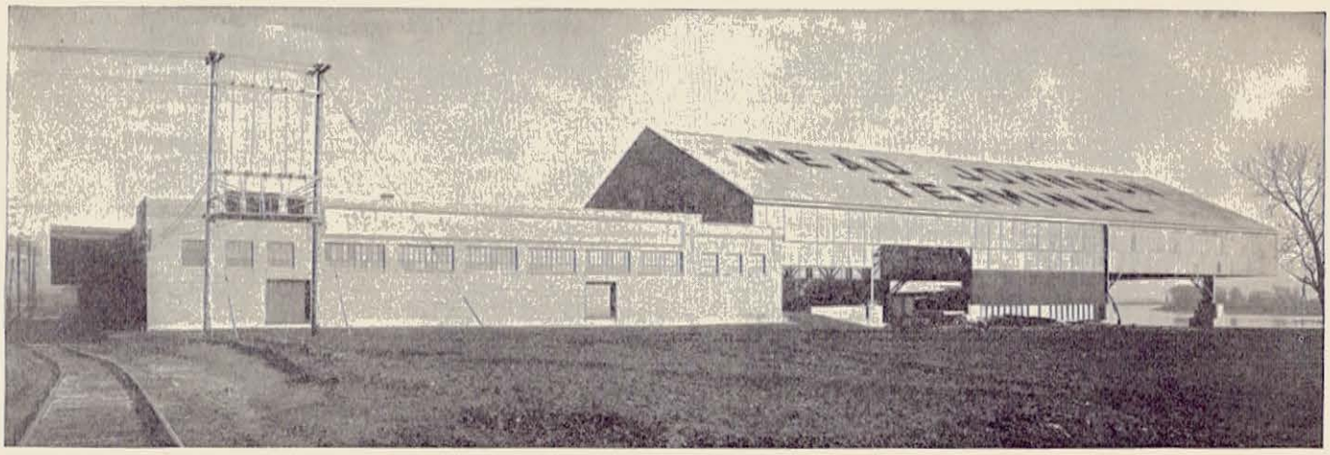
Prices—f. o. b. Peoria, Illinois

TEN	$1100	TWENTY	$1900
FIFTEEN	$1450	THIRTY	$2375
		SIXTY	$4175

CATERPILLAR

REG. U. S. PAT. OFF.

TRACTOR



Mead Johnson Terminal, Evansville, Indiana, roofed and sided with Careystone Corrugated.

Careystone Corrugated

cannot burn or rust

Buildings like the Mead Johnson Terminal, shown above, severely test any roofing and siding. Attacked by locomotive gases and damp river atmosphere, only a rust-proof, rot-proof and fire-safe product can give proper service. Careystone Corrugated—made of asbestos and cement—contains nothing to rust or rot, and is as fireproof as stone. It not only withstands exposure, but it actually becomes stronger as it ages. The application over steel framework is rapid and inexpensive, for the large sheets are usually supplied cut to size.

A Careystone Corrugated building never requires paint; being light gray in color, it reflects the sun's heat, making the building cooler in summer. Small wonder, therefore, that this better building material is being increasingly used where low first cost and the elimination of maintenance expense are considerations. It is perfectly adapted to many types of railroad construction, including train sheds, storage buildings, round houses, shops, yard offices, passenger shelters, etc.

Our engineering department will supply construction sketches and estimates without obligation. We have prepared a file size booklet giving complete data on Careystone Corrugated, including detail drawings. A copy will be gladly mailed on request.

THE PHILIP CAREY COMPANY :: Lockland, Cincinnati, Ohio

Branches in Principal Cities

BUILT-UP ROOFS
ASPHALT PRODUCTS
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WATERPROOFINGS
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HEAT INSULATIONS
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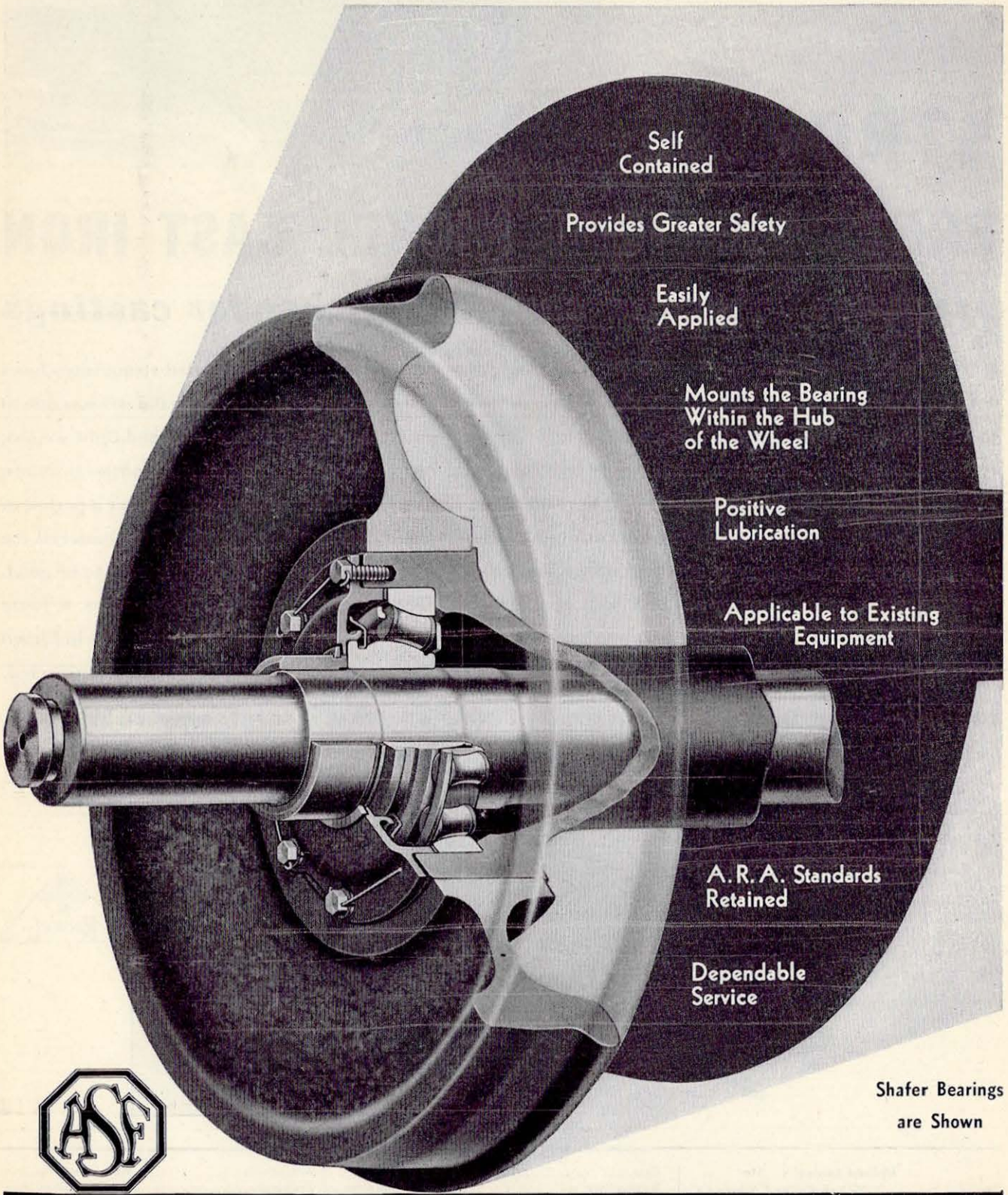
CAREYSTONE CORRUGATED SIDING
ASFALTSLATE SHINGLES
BUILDING PAPERS

547-A

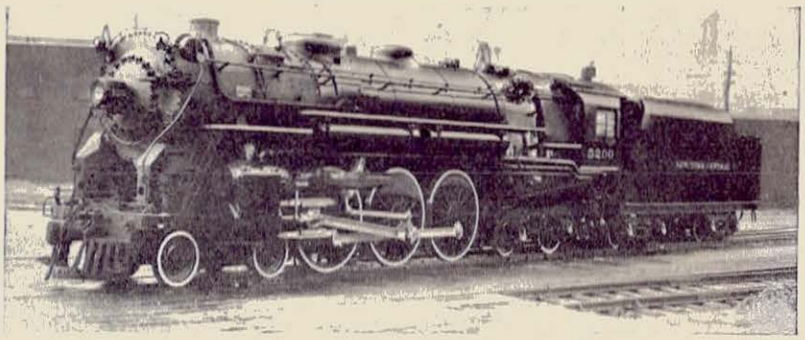
American Steel Foundries Roller Bearing Unit



AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

New York Central Hudson (4-6-4) type locomotive equipped with Elesco type "E" superheater with American Multiple Throttle cast integrally with the Nickel Cast Iron Elesco superheater header.



STRONG...

PRESSURE-TIGHT NICKEL CAST IRON

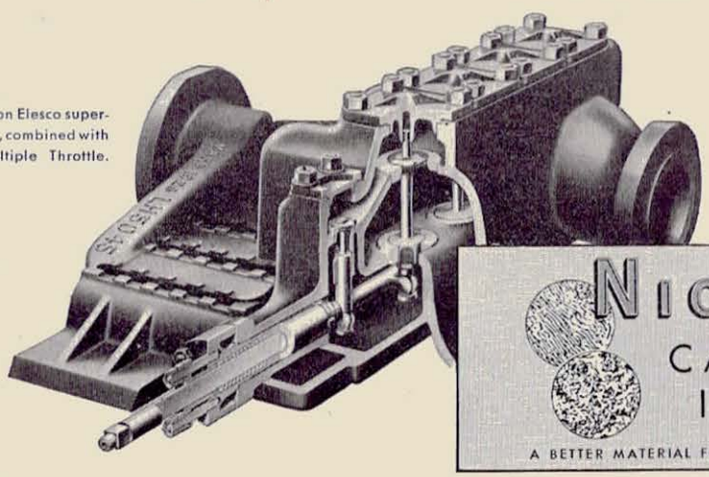
produces improved superheater header castings

• While making possible more powerful and efficient locomotives, the use of superheated steam introduces very high temperatures in the superheater headers. These headers, subjected in service to the stresses due to these high steam temperatures and vibration, and with their intricate coring, interior walls and light weight, require the highest grade of material. It must be strong and long-wearing with close-grained qualities to assure absolute tightness under high pressures. At the same time, it must have adequate strength. • Over a period of 20 years, The Superheater Company has continuously improved the strength and quality of the material for superheater header castings, by adopting scientifically developed iron alloys proved by experience to be good. Several years ago that company adopted Nickel Cast Iron for Elesco locomotive superheater headers. • Their experience shows that Nickel Cast Iron produces the strength and long-wearing qualities necessary in Elesco superheater header castings to meet the severe service conditions to which these castings are subjected.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Miners, refiners and rollers of Nickel . . . Sole producers of Monel Metal

Nickel Cast Iron Elesco superheater header, combined with American Multiple Throttle.



Our casting specialists will gladly discuss your problems with you.

INCO NICKEL

Nickel CAST IRON

A BETTER MATERIAL FOR MODERN NEEDS

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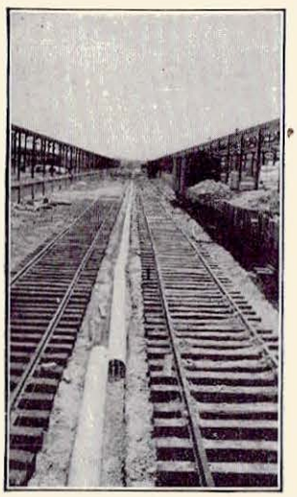
Boston	Whitehead Metal Products Co. of N. Y., Inc.
Buffalo	Whitehead Metal Products Co. of N. Y., Inc.
Chicago	Steel Sales Corp.
Cincinnati	Williams and Co., Inc.
Cleveland	Williams and Co., Inc.
Denver	Hendrie & Bolthoff Mfg. & Supply Co.
Detroit	Steel Sales Corp.
Erie	Williams and Co., Inc.
Kansas City	Steel Sales Corp.
Los Angeles	Pacific Metals Co., Ltd.
Milwaukee	Steel Sales Corp.
Minneapolis	Steel Sales Corp.
Newark	Whitehead Metal Products Co. of N. Y., Inc.
New Orleans	Equitable Equipment Co., Inc.
New York	Whitehead Metal Products Co. of N. Y., Inc.
Philadelphia	Whitehead Metal Products Co. of N. Y. Inc.
Pittsburgh	Williams and Co., Inc.
St. Louis	Steel Sales Corp.
San Francisco	Pacific Metals Co., Ltd.
Seattle	Eagle Brass Foundry Co.
Toledo	Williams and Co., Inc.

Canada

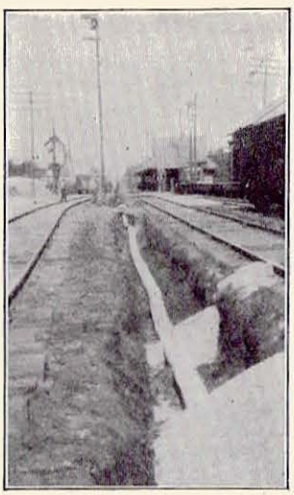
Montreal	Robert W. Bartram, Ltd.
Toronto	Peckover's Limited
Vancouver, B. C.	Wilkinson Co., Ltd.

ARMCO *Perforated* PIPE

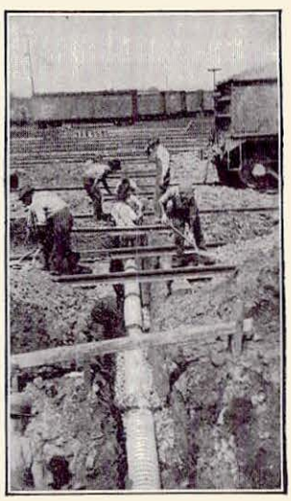
Means efficient Yard Drainage at Low Per Year Cost



Freight Terminal
Houston, Texas



Station Grounds
Appleton, Wisconsin



Freight Yard at
Toledo, Ohio

Yard and roadbed remain firm and dry, track and roadbed maintenance costs are reduced to a marked degree. That's how well Armco Perforated Pipe carries off water. Its use is a distinct economy. Railroads, country-wide, have found this long-lasting, pure iron pipe to be the most efficient, the most dependable they can install.

Armco Perforated Pipe for yard drainage is produced to meet a specific need—a pipe with an unequaled 25-year record to date of durability in the railroad drainage field. Its superiority is unchallenged.

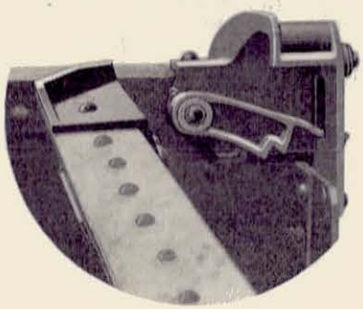
Armco Perforated Pipe has many other subdrainage uses. For example: soft spots and heaving, track pans, water pockets, multiple track; wet cuts and grade crossings.

Factual data on the use of Armco Perforated Pipe under various railroad conditions will be sent on request.

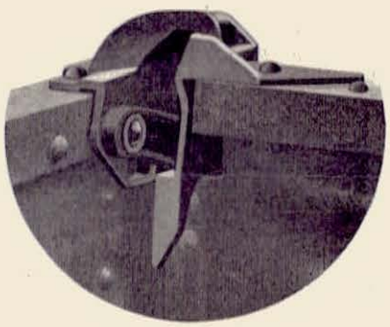
Armco culverts and drains are manufactured from Ingot Iron of The American Rolling Mill Company and always bear its brand.

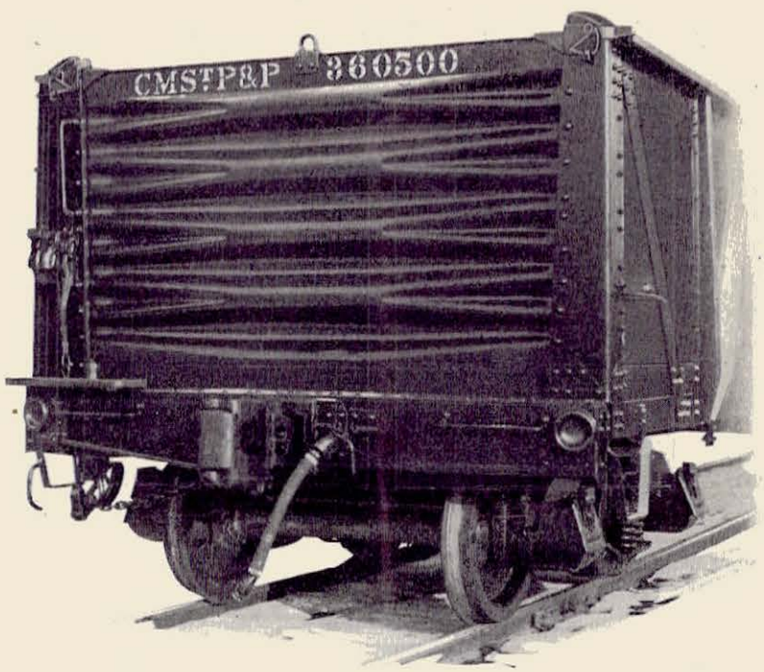
ARMCO CULVERT MANUFACTURERS ASSOCIATION
Middletown, Ohio

WINE DROP END LOCK FOR GONDOLA CARS



NO MORE PERSONAL INJURIES TO TRAINMEN FROM LOOSELY FITTING ENDS WHEN EQUIPPED WITH THIS DEVICE





LOCKS THE ENDS AS RIGID AS A SOLID END CAR

Peoples Gas Bldg.
Chicago

The Wine Railway Appliance Co.
TOLEDO, OHIO

Munsey Bldg.
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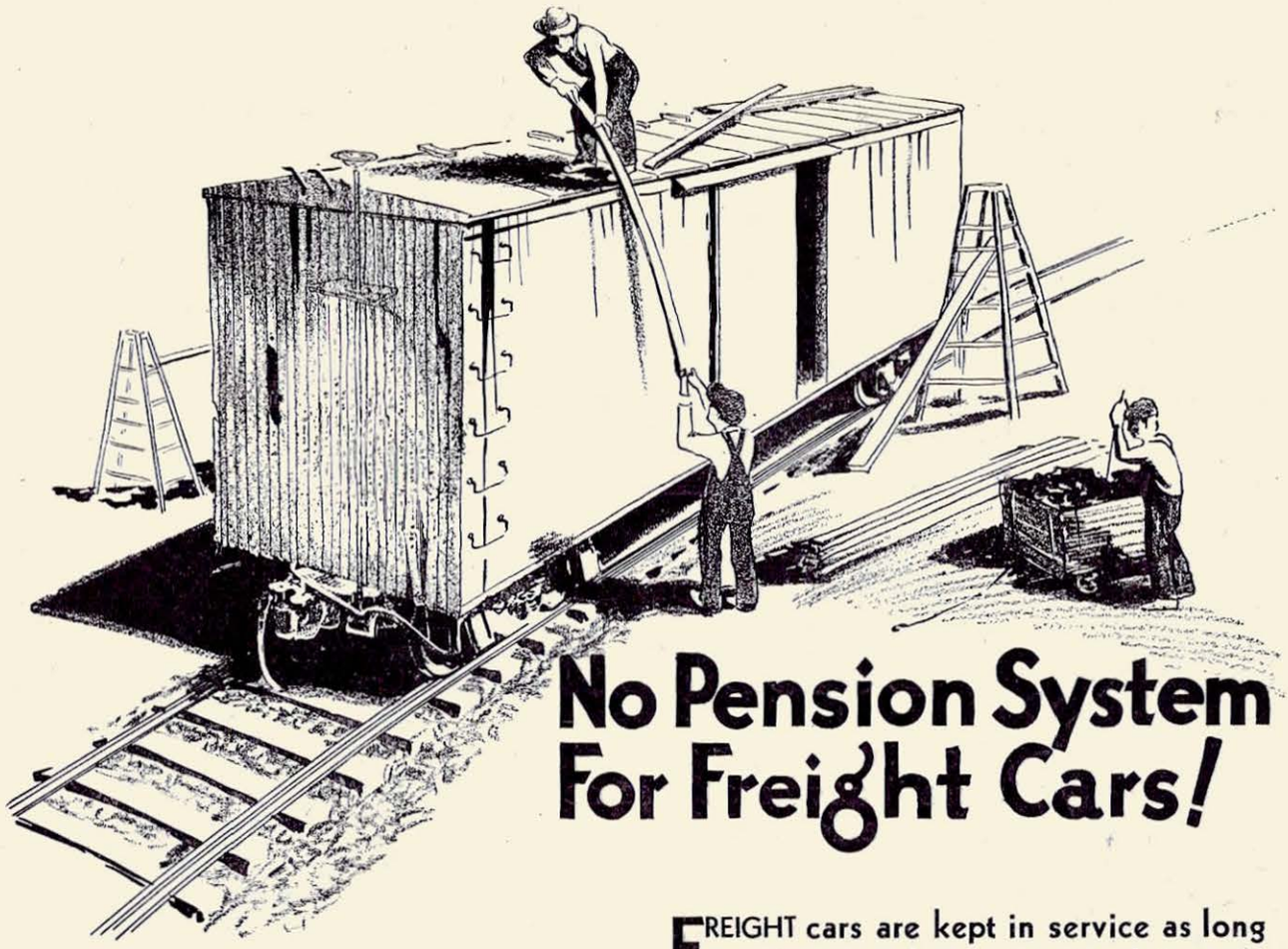
Safest
Simplest
Strongest

Wine GONDOLA DROP END Locks

Give an
Interlocking
Corner



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DRAFT GEARS

Made in types and designs to fit any kind of car construction or draft gear attachments on new or old equipment, and in sizes and capacities which meet all modern and A. R. A. requirements. » » » »

FREIGHT cars are kept in service as long as they can be maintained in safe running condition, because profitable operation depends upon long-time, uninterrupted mileage.

Increase the final earning capacity of your freight cars by replacing inadequate draft gears with Cardwell Westinghouse Draft Gears.

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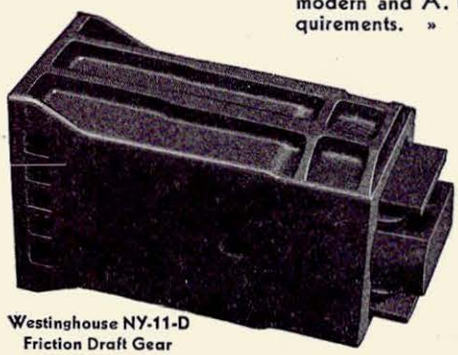
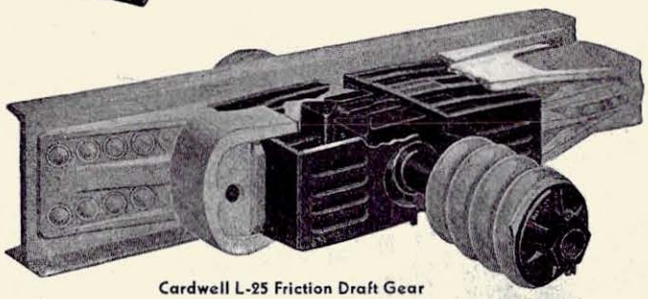
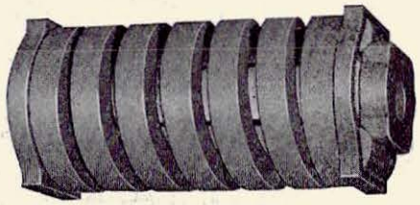


Westinghouse NY-11-D
Friction Draft Gear

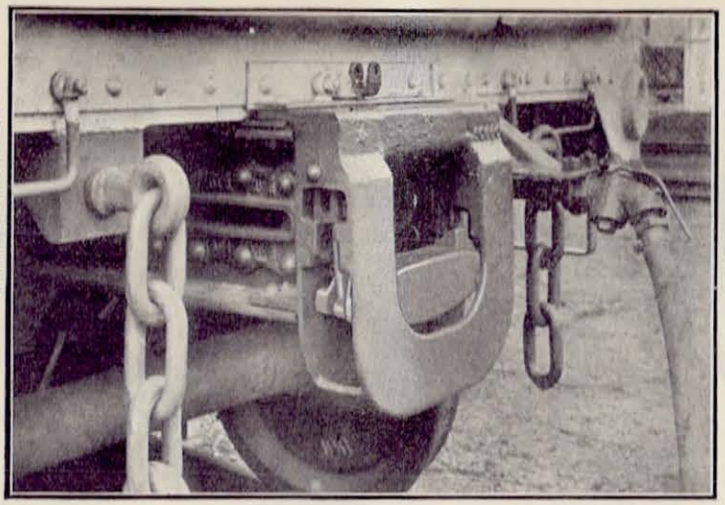


Cardwell L-25 Friction Draft Gear



Cardwell Westinghouse Friction Draft Gear Type F 2

GOOD DRAFT GEARS MAKE CARS GO FARTHER



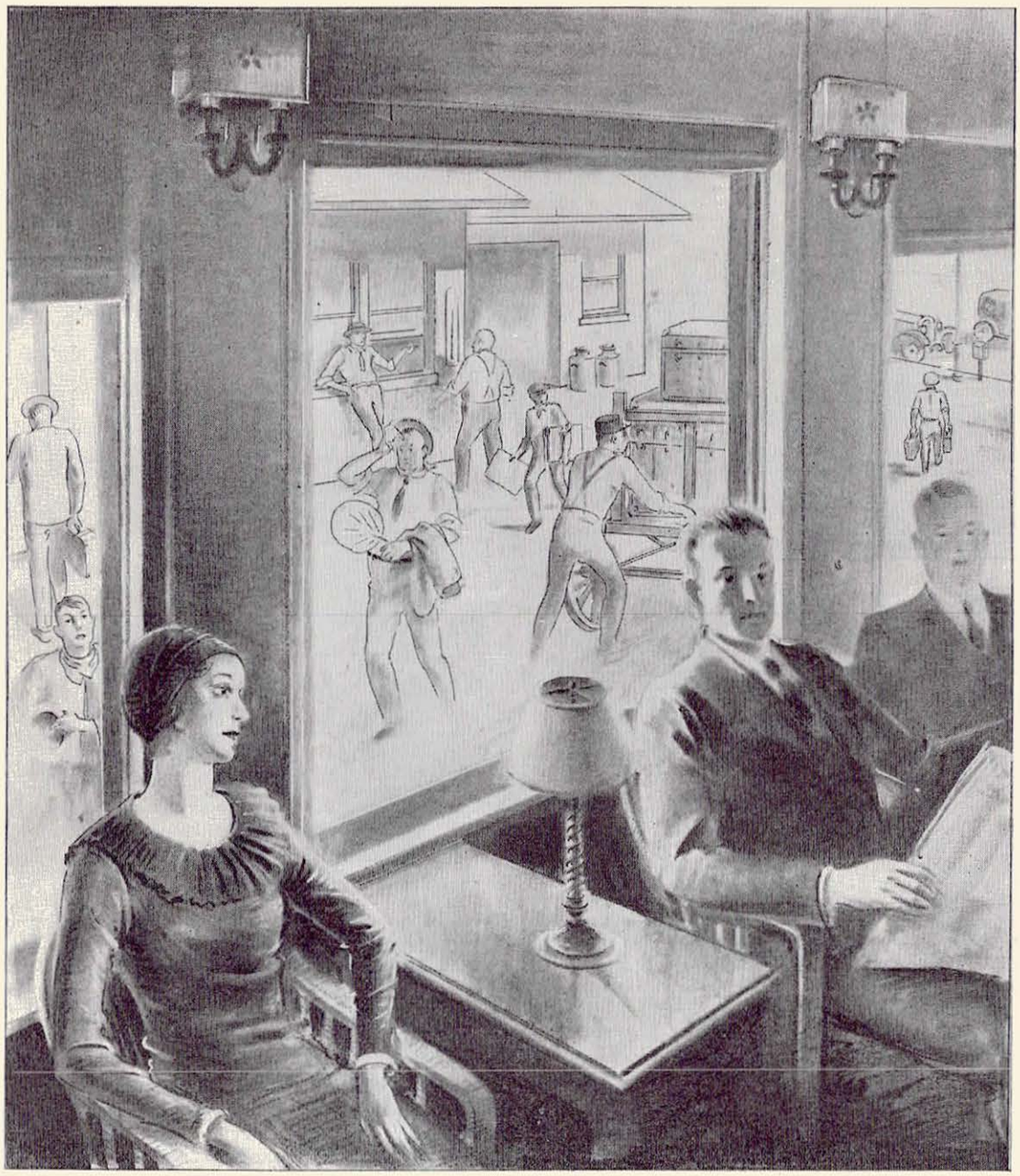
Advantageous Substitution

Bolts, nuts, pins and cotters have their uses, but where the same functions can be performed by one piece which cannot become lost, an advantage is obtained. The carry iron of the Union Centering Device is supported on reversible drop forged links, alike at both ends and interchangeable with each other.

Union Metal Products Company

New York Chicago
Kansas City Washington
St. Louis Houston
San Francisco
Richmond
Montreal

AIR CONDITIONED CARS



Comfortably Cool Inside—Tropical Temperatures Outside

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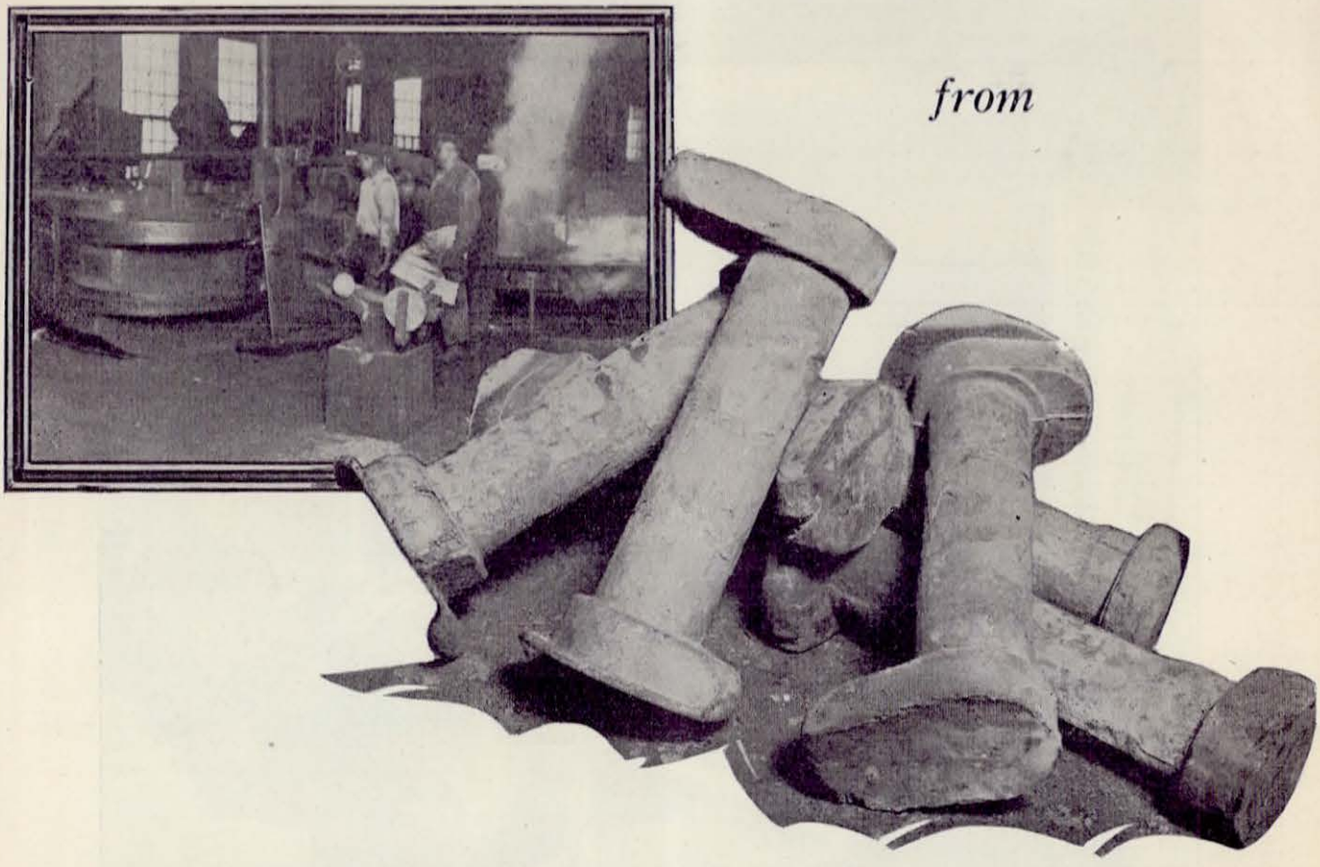
MAKE YOUR LOCOMOTIVE AND PASSENGER CAR

FORGINGS



from

VULCAN IRON FORGING BILLETS

USE Vulcan Bloom for Staybolts. Vulcan XX for Engine Bolts and Chain.

IN all locomotive forgings and passenger car equalizers uniform strength and ductility where the stresses occur is of first importance. To attain these characteristics in forging necessitates iron made from the highest grade of pig.

Vulcan Iron Forging Billets are made from clean high grade pig—This iron is quickly forged, easily machined or welded, and above all else dependable in service, low in maintenance.

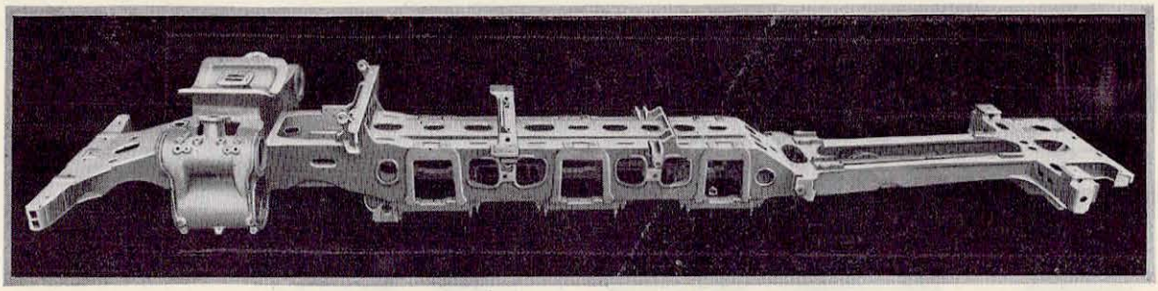
For nearly 50 years Vulcan processes of manufacture and selection of materials have been standardized to deliver maximum efficiency under various requirements.

LOCKHART IRON AND STEEL CO.

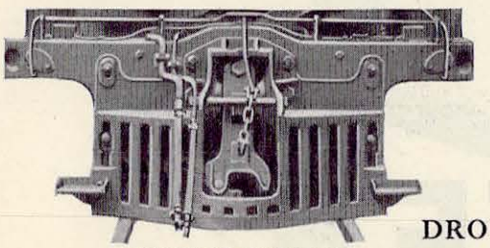
Pittsburgh, Pa.

DIRECT MILL REPRESENTATIVES
BLATCHFORD CORPORATION
Railway Exchange,
CHICAGO, ILLINOIS

Commonwealth Products
(CAST STEEL)
For Locomotives
MAINTENANCE SAVING DEVICES

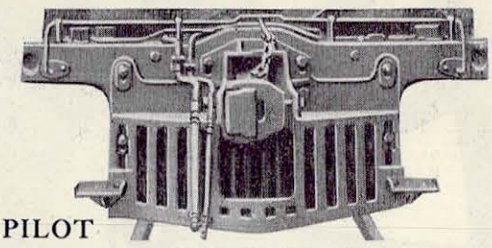


LOCOMOTIVE BED WITH INTEGRAL CYLINDERS

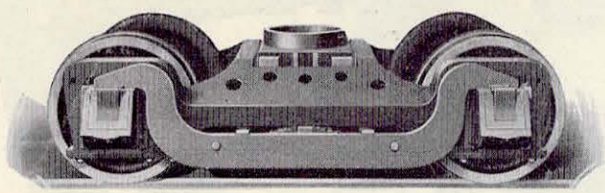


COUPLER DROPPED

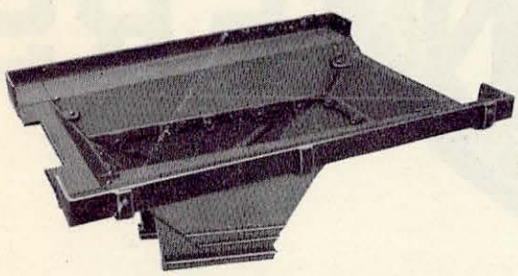
DROP COUPLER PILOT



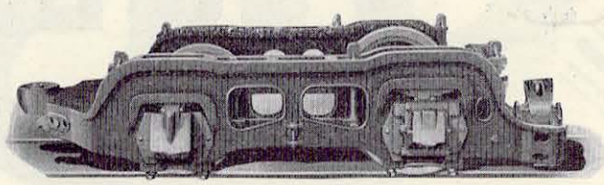
COUPLER RAISED



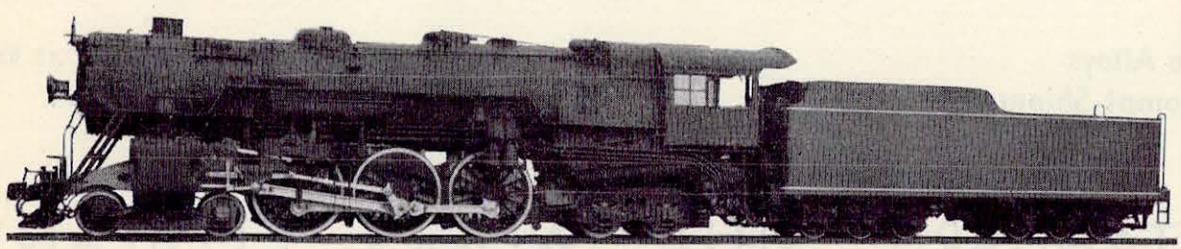
FOUR WHEEL "OUTSIDE JOURNAL" ENGINE TRUCK



SINGLE HOPPER ASH PAN



FOUR WHEEL "DELTA TYPE" TRAILER TRUCK



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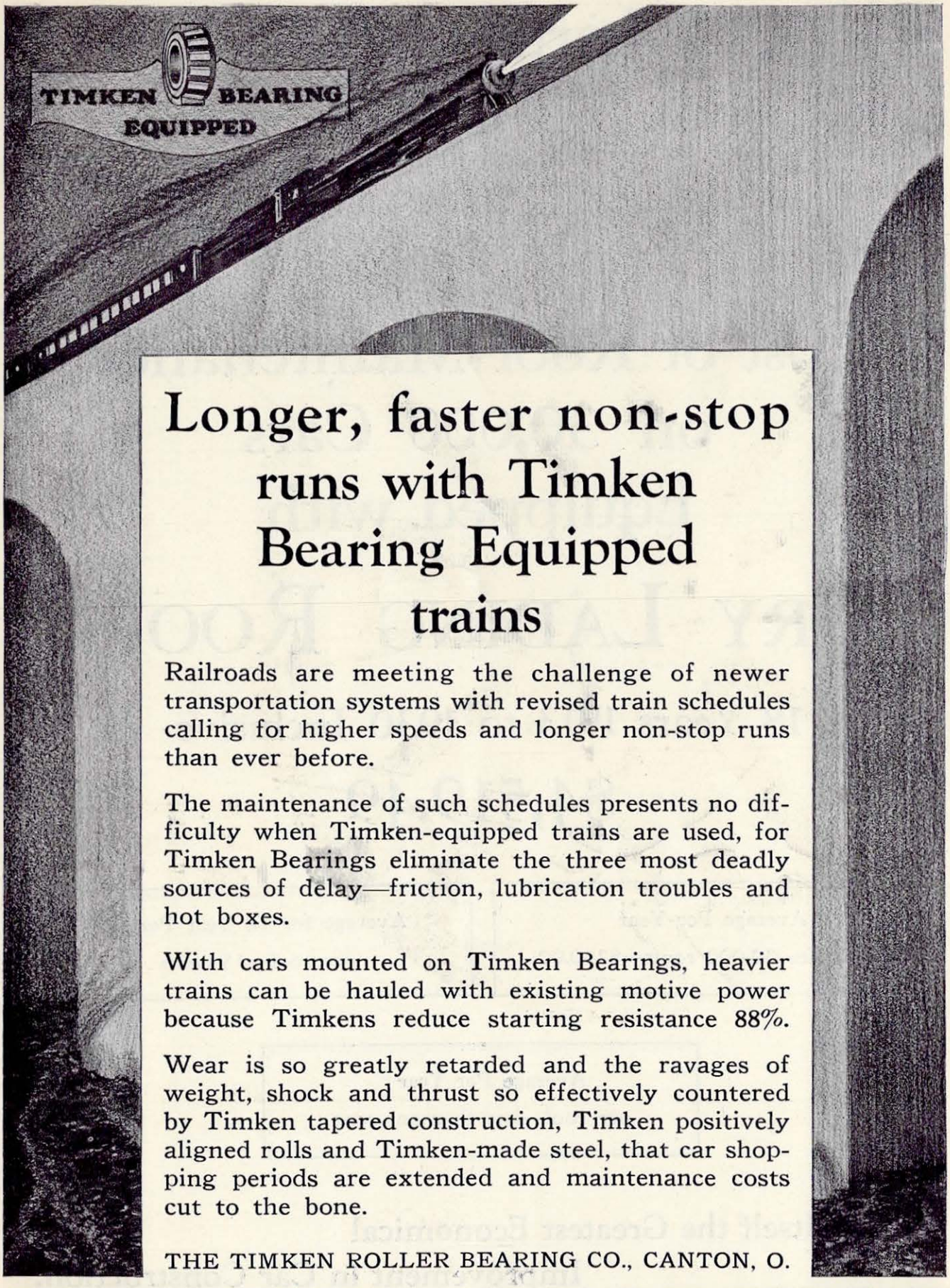

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Railroads are meeting the challenge of newer transportation systems with revised train schedules calling for higher speeds and longer non-stop runs than ever before.

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18 Years 1913 to 1930 Inclusive-

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Average Per Year for entire 30,000 roofs—$250.00	Average for 18 Year Period per roof—15 cents

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per roof—less than one cent

Proves Itself the Greatest Economical Improvement in Car Construction.

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RAILWAY AGE

Public Responsibility for Railway Situation

The necessity for the Interstate Commerce Commission to pass, under such general business conditions as now exist, upon an application of the railways for a general advance in freight rates illustrates that once the public, through the government, interferes extensively with the management of an industry, it is pretty sure, sooner or later, to find that those who call the tune must also pay the piper. We constantly hear questions as to why railway executives have not done this thing or that thing instead of asking for an advance in freight rates in a period of depression. The answer to almost every one of these questions is that they could not do the thing suggested because of some kind of government interference.

Reductions of Rates Since 1921

In the early part of 1922 the railways voluntarily made a reduction of ten per cent in the rates upon all farm products in an effort to influence the Interstate Commerce Commission to rescind an order already issued by it for a relatively larger reduction in the rates upon grain and grain products. The Commission not only left its grain rate order in full effect, but a few months later ordered a reduction of ten per cent in rates upon all freight traffic. General business already had begun to revive from the depression of 1921, showing that industry and commerce did not need this reduction of rates. The effect of it, and of subsequent reductions, and of refusals of the commission to permit advances, was to prevent the railways from earning a fair return during any of the seven years of general prosperity ending with 1929, and to cause them to enter 1930 with rates almost certain to prove too low in a period of depression. For the "whittling away" of rates during this period, with the result that in 1930 average revenue per ton per mile was 16½ per cent less than in 1921, competition between the railways was partly responsible. The difference between freight earnings in 1930, and what they would have been on the basis of the average revenue per ton per mile of 1921, was, however, $810,000,000, and at least three-fourths of this was due to decisions of the Interstate Commerce Commission. Whatever may have been the mistakes of railway managements, the present financial emergency of the railway industry is much more largely due to the commission's regulation of rates since the early part of 1922. The commission represents the public, and the public has the legal right and power to regulate the railways, but after having exercised that power it cannot reasonably deny its responsibility for the natural results, and ask why railway managements have not prevented them.

The Public and Railway Wages

Some persons ask why railway wages were steadily advanced throughout the five years ending with 1929, and are not now reduced. Almost all the advances made were due to awards of arbitration boards created under the Railway Labor Act of Congress, and the balance of power on these boards was held by representatives of the public. Late in 1929, when no one anticipated that the present depression would be so profound and protracted, railway executives accepted a suggestion of the president of the United States that industry pledge itself not to reduce wages; and it is still the policy of the national administration and of most major industries to maintain them. In view of these facts, the public clearly cannot evade a large measure of responsibility for present railway wages.

On "Meeting Competition"

Some persons criticise railway managements for not having protected their traffic by meeting better the competition of carriers by water and highway. How, in the circumstances, could they have met it much better? These other carriers are subsidized, while the railways are not. Because of the subsidies they receive from the taxpayers they can make rates lower than the total cost of rendering their service, while the railways must pay all their costs out of their own earnings. If railway managements could have made rates as they pleased they probably would have reduced them where they encountered the competition of other carriers and maintained or increased them where they did not meet

such competition, but they are prohibited from practicing unfair discriminations and from making lower rates for longer than for shorter hauls, without the permission of the commission. The commission forbids them to make lower rates for longer than for shorter hauls to meet the competition of steamship lines operating through the Panama canal. The competition of motor trucks is principally for short hauls, but, without the permission of the commission, the railways cannot reduce their rates for these short hauls to meet competition without also reducing their rates for longer hauls. Clearly the public cannot hold the managements of the railways responsible for not fully meeting the competition of other carriers as long as the state and national governments use both their taxing and regulating powers to handicap and restrict the railways in meeting competition.

Some Views from Henry Ford

Henry Ford recently has endorsed the view, which already had been expressed by some other persons, that there are many miles of unprofitable railroad lines which should be torn up and replaced by motor bus and truck lines. Under existing laws railway service cannot be reduced below an uncertain minimum, and railway lines cannot be torn up at all, without the authorization of state and national government regulating bodies, and petitions for authorization to reduce service or tear up lines are constantly being denied. The public usually insists upon railway service being maintained whether it uses it or not. In all parts of the country a large share of the taxes that support local governments and schools are derived from unprofitable railway lines, and the public insists upon them being kept in existence in order that it may tax them, although the earnings from which the taxes are paid are derived largely from lines in other communities and even in other states. The public cannot compel the railways to keep in existence unprofitable property and at the same time rationally or fairly deny its responsibility for providing the revenues that this policy makes it necessary for the railways to have.

Managing Railways "Like Other Business Concerns"

It is astounding that we should often hear the question asked, even by traffic managers of chambers of commerce, who pose as experts regarding transportation matters, as to why the officers of railways do not run their business as the managers of other kinds of large concerns run their business. The obvious answer is that they do not do so because the public will not let them. The public adopted and maintains its present policy of regulation of railways expressly because it does not want them run like other business concerns. It could have stopped, as it did in the original interstate commerce act, with a prohibition of unfair discrimination, but it went much farther. The railways never asked the public to assure them a fair return until after it definitely adopted a policy of restricting their profits as it did not and does not restrict the profits of other industry. The public did not have to disregard the constitutional right of the railways to a fair return by fixing rates that have now brought them to the verge of bankruptcy during the present depression. It did not have to aggravate the railway situation by subsidizing competing carriers without regulating them while imposing upon the railways restrictions that prevent them from meeting competition in the same ways that other kinds of business concerns can and do meet it. But the public cannot rationally expect to both eat its cake and keep it. It cannot cause the government to treat the railways differently from any other class of business concerns and then rationally ask why the railways, unlike other industries, now appeal to a government body for relief. If the railways were treated like other business concerns they would not have to ask any government body for permission to change their rates.

A Divided Responsibility

Commissioner Eastman referred in a recent address to the Traffic Club of New York to the fact that the responsibility for the conduct of the railways is divided between their officers and public regulating authorities. This division of responsibility can easily be abolished. It can be abolished either by the government completely taking over the ownership and management of the railways or by the government completely withdrawing its regulation from them. The public's share of responsibility for railway results could also be reduced by reducing its regulation of railways, and reducing its subsidization and increasing its regulation of competing means of transportation. The public does not have to interfere with or participate in the management of the transportation industry or of any other industry. When it does interfere or participate, however, it must, in its own interest, take its full share of responsibility for results.

If the public does not assume its responsibility for its past and present entirely unnecessary, excessive and unfair interference with the transportation industry by providing the railways with the revenues they need it will pay for that interference by suffering the results of a breakdown of railway credit and service which it will have brought upon itself. It may try to evade its responsibility by "passing the buck" to railway managements, but in the long run it will either assume its own share of responsibility, or it will pay dearly, as it has in the past, for evading it.

The Freight Container

Two things, in our opinion, have retarded the widespread development of container service for l.c.l. freight. One of these has been the rate situation, but the Interstate Commerce Commission probably went a considerable distance towards clearing this up in its recent decision holding that present and proposed con-

tainer rates, taken as a whole, are too low. The way was left open, however, for the establishment of new rates on a basis which may merit the approval, not only of the Commission, but also of the railways in general, few of which have as yet undertaken container operation.

The other obstacle which has retarded the adoption of container service is the size of the containers most commonly used. These containers are large, and the opinion is widely held that only consolidating companies are in a position to benefit from their availability, few individual shippers—estimated by some at 2 per cent of all shippers of l.c.l. freight—having a sufficient volume of business moving from one originating point to one destination point to permit them to take advantage of the container service.

It is generally accepted that there are certain advantages inherent in freight containers, advantages which may be enjoyed not only by shippers, but also by the carriers. Economy results from the saving in time and expense on the part of the shippers in packing and wrapping shipments, and in the elimination of individual handling of packages by the railroad at the originating and destination freight stations. Loss and damage claims are virtually eliminated. Much time in transit is saved.

Granting these advantages to the container, does it not follow that rates should be so fixed and the containers themselves should be of such design and size as to make possible their use by many shippers of l.c.l. freight, rather than by only a few? The advantages of large containers would be available also in a measure in smaller containers. We believe that the more general use of freight containers would be materially hastened if a variety of types and sizes, rather than only two or three types of large size, were available.

A Lesson in "Co-ordinated Transport"

In the midst of current discussions concerning "co-ordinated transportation"—discussions revealing a wide divergence of opinion as to what co-ordinated transportation actually is and as to how it can best be brought about—it is both encouraging and refreshing to take note of at least one instance where the ideal is, apparently, about to become a reality. Just such a situation, as it is now being worked out for the benefit of Nyasaland, a British protectorate in East Africa, is that which was described in the *Railway Age* of May 16, page 1002.

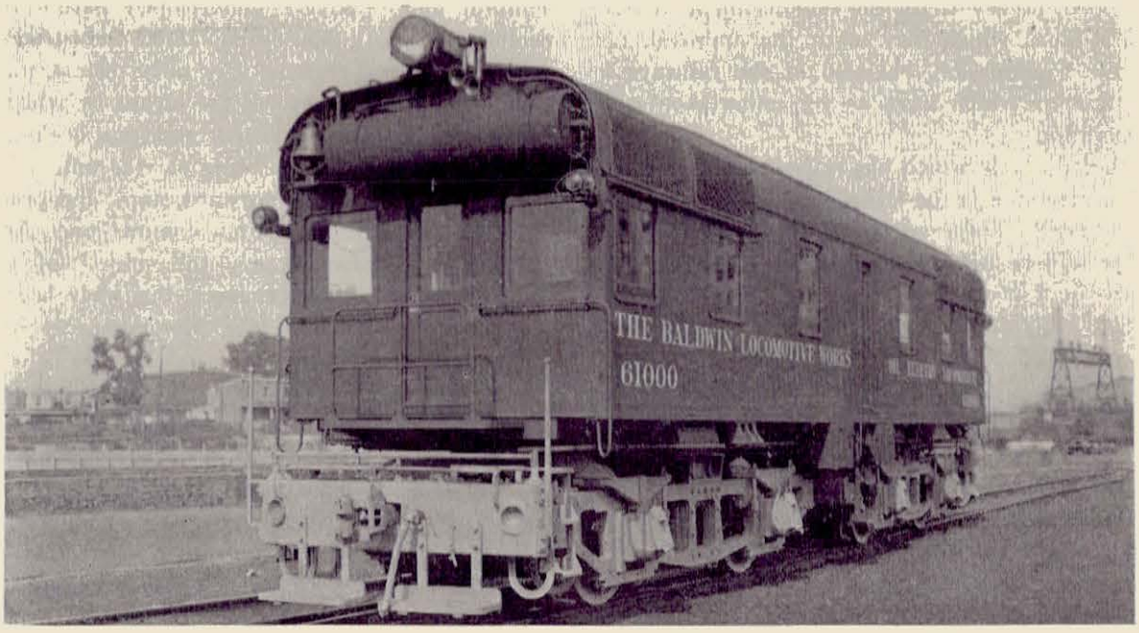
Granting that the transportation facilities now being developed in Nyasaland and its surrounding territory are designed to serve a population and a traffic that are relatively insignificant as compared with the world's total; granting even that the type and amount of transportation adequate for the sparsely populated, agricultural and relatively undeveloped parts of Africa would not satisfy densely populated, industrialized and highly-developed regions, it is, nevertheless, interesting and worthwhile to observe the means by which a program of co-ordinated transportation has been developed there and by which it is being carried out.

Like so many other forward steps, the program in question was the work of a commission. Appointed originally to consider only the subject of a bridge over the Lower Zambezi river, this body later broadened its scope to include a comprehensive survey of transportation requirements for all the surrounding territory, a matter which, from this distance at least, it appears to have handled thoroughly, carefully and wisely. Subsequently, the report of this commission, instead of being criticized and condemned, was adopted, virtually without change. And its adoption has resulted in arrangements for the consolidation, connection and extension of existing railways; in steps for the development of connecting steamer services on Lake Nyasa, a body of water as naturally navigable as our own Great Lakes, and in plans for the construction of highways tributary to the main railway and lake services.

Of the two points of principal interest, however, the first is that the Nyasaland government and existing railways, all privately owned, are co-operating with each other to the fullest possible extent to accomplish results that must be beneficial to both, while the third interested party, the British Imperial government, has shown its active approval by the granting of necessary loans and guaranteeing of interest payments during the developmental period.

The second, and the more important, is that three distinct types of transportation are to be used, each in its proper sphere and each co-ordinate, rather than competitive, with the others. Railways are recognized as the backbone of the general system, to be used, therefore, where traffic is heaviest and hauls are longest, and to be extended as conditions warrant and funds allow. Steamer services are to be operated as extensions of rail lines, and only as extensions thereof; while highways are to be built not parallel, but at right angles, to the through rail-lake route—non-competitive feeders, serving as branches of the main train and steamer services. On the other hand, proposals for the construction of costly motor roads parallel to and competitive with railways, or for the still more costly and uneconomic canalization of every available river and stream, are chiefly conspicuous by their absence.

The actual forms of transportation involved are not new, and the scale of use is not large, but it is evident that much may be learned, even from the so-called "Dark Continent," concerning the true meaning of co-ordinated transportation, the value of study and co-operation in developing it, and the proper and intelligent use and interrelation of various forms of transport.



Baldwin Oil-Electric Locomotive

Power by a 1,000-hp. Krupp Diesel engine, with all the weight on the drivers, it develops 67,500 lb. tractive force

IN 1925 the Baldwin Locomotive Works constructed its first oil-electric locomotive equipped with an oil engine of Knudson design, rated at 1,000 hp. During tests it was found the rated power was not developed and experience in the operation of the locomotive indicated that more satisfactory results could be obtained with a different type of oil engine. Consequently, a second locomotive, No. 61,000, equipped with a Krupp engine of the Diesel type, has been constructed at the Baldwin Works. The principal weights, dimensions and equipment of this locomotive are given in the accompanying table.

The locomotive was designed for switching service, with a maximum speed of 25 m.p.h. The weight of 270,000 lb. is carried on four pairs of drivers, in two articulated four-wheel trucks. The truck frames are of the regular cast-steel bar type used in locomotive construction, with the usual pedestals and caps. The driving springs are mounted directly on the journal boxes and are of the "twin" design, mounted on each side of the frames. By this means an essential lowering of the cab deck is accomplished.

The two side frames of the trucks are tied together by end sills of cast steel. Harvey twin-spring draft gear, with Farlow two-key attachments and Type D couplers, are used at one end, while on the other end buffing bumpers with a drawbar connection are used to join the trucks, forming an articulated construction. On each truck a central crosstie of integral cast-steel construction carries the center plate upon which is mounted one of the center pins of the cab underframe. These crossties also embody brake-hanger supports, brake fulcrum brackets, motor suspension brackets, side bearings, and, in addition, supports for the air-brake cylinders which are mounted upon each truck.

The weight per axle is 67,500 lb., which, at 25 per cent adhesion for four driving axles, gives a theoretical tractive force of 67,500 lb. up to five miles an hour. This high tractive force is obtained by concentrating all the weight on the driving wheels. An electric motor with twin-gear drive is mounted on each axle. The gear ratio from the armature shaft to the axle is 16 to 76.

With the articulated type of truck arrangement the shocks of switching are taken entirely through the trucks. The draft of the trailing load is also taken entirely through the trucks and drawbar between units. In this way the cab or upper structure is relieved of shocks due to heavy kicking or collision, which cause bending of the cab frame in the swivel-truck type of construction.

The couplers, too, are more nearly in the center of the track when the occasion arises for coupling or uncoupling cars while on curves or crossovers.

A feature of construction of this locomotive is the cast-steel cab underframe. This is a one-piece casting 44 ft. in length, upon which is mounted the steel cab and the power plant consisting of the oil engine and electric generator. Main reservoirs of 25,000 cu. in. capacity each are mounted at each end of the cab over the end doors. Electric headlights are mounted on each end of the cab above the reservoirs. The locomotive is equipped with two-tone pneumatic horns and air-operated bells. The locomotive is operated from either end, the operator's compartments being separate from the engine room but communicating with it by means of a door for emergency use. The operator's

compartments are equipped with cab seats, electric controllers, air-brake valves, and panels with air gages and ammeters, the necessary light switches, bell-ringer valves, sander valves and control switches. Fuel-oil tanks, each with a capacity of 400 gal., are also located in the operator's compartments. These tanks are connected with an equalizing pipe. The fuel oil is pumped by a small pump attached to the oil engine into a current supply tank from this equalizing pipe. The fuel, therefore, is at the same level in both tanks and no transfer of weight occurs as the fuel is consumed.

Another innovation in the design of the locomotive is the means used for the simultaneous operation of the electric controller and the oil-engine throttle. The oil engine is fitted with an over-speed governor set for 500 r.p.m. Other speeds are controlled by means of the throttle, from an idling speed of 250 r.p.m. This is accomplished by a lever attached to the electric controller shaft, actuating a hydraulic cylinder which, in turn, by means of a tube connection to a second hydraulic cylinder and lever, moves a cam mounted upon the governor which manipulates the throttle of the engine.

The cab is provided with five ventilators mounted in the clerestory. This clerestory portion of the roof is detachable and provides for the removal of the engine or any other equipment that it may be necessary to overhaul. Ample light is secured by means of the sixteen windows, in addition to four glazed doors. In the storage battery crates located on the left side are mounted 30-volt, 15-cell MVA-11 Ironclad Exide batteries which are used for cab lighting, control circuits and for operating the piston-cooling oil-pump motor for a period of ten minutes after the engine is stopped. This is a 2-hp. motor running at 1,500 r.p.m. which is used to circulate 45 gal. of piston-cooling oil per minute against a discharge pressure of 28 lb.

Principal Dimensions, Weights and Equipment of the Baldwin Oil-Electric Locomotive No. 61,000

Dimensions and Weights	
Length over couplers	51 ft. 0 in.
Length over cab	44 ft. 0 in.
Height over all	15 ft. 8¾ in.
Height center line of crank shaft above track	7 ft. 0 in.
Width over all	10 ft. 6 in.
Wheelbase—rigid	10 ft. 6 in.
Wheelbase—total	35 ft. 6 in.
Driving wheel diameter	48 in.
Journals	8½ in. by 15 in.
Weight—total	270,000 lb.
Weight on drivers	270,000 lb.
Tractive force at starting	67,500 lb.
Oil Engine—Krupp	
Type	4-cycle, airless injection
Number of cylinders	6
Bore and stroke	15 in. by 15 in.
Brake horsepower	1,000
Revolutions per minute	500
Supercharging air pressure	6 lb. per sq. in.
Electrical Equipment—Westinghouse	
Generator	Type 478-A
Motors—four	Type 355
Voltage	500 D. C.
Westinghouse Air Brake	Type 14-E1 Special

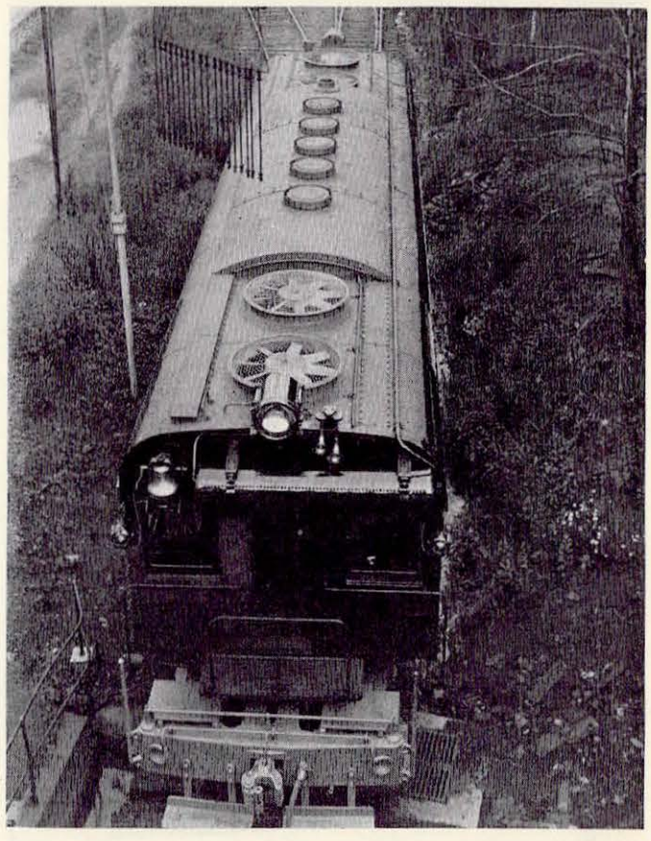
In the engine room at the generator end is mounted the electrical control equipment and also an instrument board upon which are provided an indicating pyrometer for observing the exhaust temperatures of each cylinder exhaust, an electric tachometer for determining the speed of the engine in revolutions per minute, a voltmeter, ammeter, light switches and pressure gages for the oil lines to the radiator vents.

In the engine room are also mounted air drums which have a capacity of 42,000 cu. in. at a pressure of 355 lb. per sq. in. Air at this pressure is used for starting the Diesel engine and also to provide air-brake pressure when the pressure in the brake reservoirs falls below 115 lb.

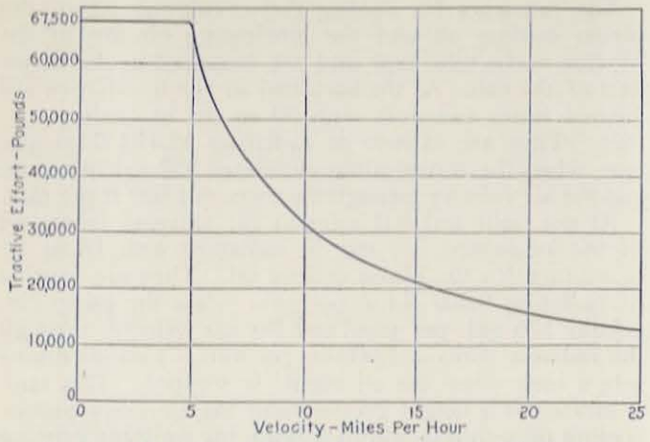
The radiators for cooling the circulating water, the piston cooling oil and the lubricating oil are of the Modine turbo-tube type and are mounted in the upper part of the cab. At the back end of the locomotive are located water radiators with 30 sq. ft. of cooling surface. They are capable of radiating 33,450 B.t.u. per min. when the water pump circulates 307 gal. per min. and the air velocity through the cores is 1,600 ft per min.

At the right and left sides of the extreme front end of the locomotive are the oil radiators with 15 sq. ft. of surface for the piston cooling oil. They are capable of radiating 9,300 B.t.u. per min. when the pump circulates 176 gal. per min. and the air velocity through the radiator cores is 1,600 ft. per min. This oil drains into a tank when the oil engine is stopped. This tank is located at a height greater than the auxiliary piston-cooling oil pump to afford a head for constant priming of this pump when used after the engine shuts down.

At the left and right sides near the front end of the locomotive are located oil radiators, each having 15 sq. ft. of surface for cooling the lubricating oil. They are capable of radiating 3,315 B.t.u. per min. when the lubricating oil pump circulates 88 gal. per min. and the air velocity through the radiator cores is 1,600 ft. per min. The lubricating oil consumption is estimated to be about 1 gal. per 2,000 hp. hr. The passage of air through the radiator for the transfer of the heat is provided by four Betz-type fans mounted in the roof of the cab. These are constructed of aluminum alloy and are of eight-blade design, by Siemens Schuckert. They are each 39⅜ in. in diameter over blades and circulate 28,750 cu. ft. of air per min. at 1,900 r.p.m. They are driven by four Westinghouse 15½-hp. motors, operating at variable voltages direct from the main generator.



Top View of the 61,000 Showing the Mounting of the Air-Circulating Fans

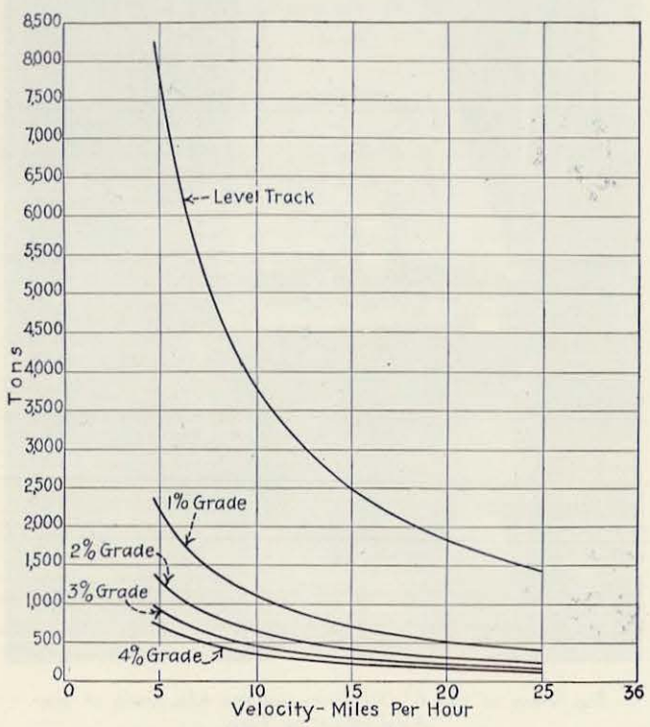


Tractive Effort-Speed Curve for the Baldwin Oil-Electric Locomotive No. 61,000

The Krupp Diesel engine is a four-cycle, single-acting, six-cylinder engine of the airless fuel-injection locomotive type, with a 15-in. bore and 15-in. stroke. The engine develops 1,000 b.hp. at 500 r.p.m. The weight of the engine is 47,000 lb., which includes all manifolding, the flywheel and the muffler.

A fuel consumption of .465 lb. per brake horsepower hour is shown by test with a mean indicated pressure of 135 lb. per sq. in. when using fuel oil of a heat value of 18,700 B.t.u. per pound. The test also showed a mechanical efficiency of 73 per cent at full load and full speed. This efficiency includes all attached auxiliaries, such as the piston cooling oil pump, the lubricating-oil pump, the water-circulating pump, the fuel-oil transfer pump and the air compressor, the latter being attached to and driven by the engine to furnish brake air, starting air and supercharging air.

When the engine had been in operation for about 2,500 hours it was dismantled for inspection purposes and for checking wear of working parts. No appreciable wear could be detected on the crankshaft. The main thrust bearing showed wear, as did two large end connecting-rod bearings which were rebabbitted. A new set of piston rings were also applied. The cylinder liners showed .003 in. wear.



Theoretical Hauling Capacity of the No. 61,000 for Various Grades in Relation to Speed

The electrical equipment was manufactured by the Westinghouse Electric & Manufacturing Company. The generator is a compensated railway type, with a direct-connected exciter. It is connected to the oil engine through a flexible coupling mounted in the flywheel. The connection between generator and engine is through eighteen nests of straight springs. The main motors mounted on the driving axles are designed essentially for heavy switching service. Unit switches are used for connecting the traction motors to the generator and to shunt some of the current from the main motor field after the locomotive has reached a predetermined speed to further increase that speed.

Reversers control the direction in which the locomotive moves. They are of the drum type operated by electro-pneumatic valves which are controlled by the reverse handle of the master controllers. An ammeter is located on the panel board in each operator's compartment, connected to a shunt in the main generator armature circuit, indicating the total current taken by the traction motors.

A torque governor is connected in the armature and field circuit of the generator and operates to keep the torque of the generator from exceeding that of the oil engine when the oil engine is running at full throttle and at speeds between 250 and 500 r.p.m. Throttle master controllers located at each operator's station control the output of the oil engine and power of the traction motors by means of the main handle. The reverse handle is used for cutting off the control circuits and operating the piston-cooling oil-pump motor, in addition to controlling the reversers as referred to above.

During preliminary tests, conducted primarily for the purpose of synchronizing the engine and electrical equipment, trains ranging from 2,000 tons to 4,500 tons were handled by the locomotive. Since these tests the locomotive has been tried out in the yards of six roads—the Pennsylvania; Illinois Central; Chicago, Rock Island & Pacific; Atchison, Topeka & Santa Fe; New York, Chicago & St. Louis, and Northern Pacific. In this service it has run 15,000 miles and has operated about 4,000 hr. in practically continuous operation. In addition to this, a two months' trial was made in heavy mine drag haulage in the open-pit mines of the Oliver Iron Mining Company in Minnesota.

The test department of one road reports an average fuel consumption of 7.3 lb. per car-mile used by the Diesel locomotive against 51.5 lb. of coal used by the eight-wheel switching locomotive regularly used in the same yard. The cost of coal in this case was given as .1424 cents per lb. The price of fuel oil is 3.57 cents per gal., or .45 cents per lb. The cost of fuel per car-mile showed a saving of 45 per cent in favor of the Diesel-electric locomotive.

Out of 7,669 suburban and through passenger trains operated over the Morris & Essex (New Jersey) division of the Delaware, Lackawanna & Western during the month of May, 99.2 per cent arrived exactly on time. The average delay per through train was less than eight seconds, while suburban trains averaged less than two seconds late. Only one delay was chargeable to track or signal conditions, and but one to failure of equipment. Causes responsible for delays included draw-bridges open for passage of water traffic, heavy trains loading and unloading milk, baggage, newspapers, etc., while one train was held up by a dog fight on the track, as reported in the Odds and Ends department of *Railway Age*, June 20.

A. S. T. M. Holds Convention at Chicago

Large attendance at thirty-fourth annual meeting embracing sixteen sessions in four days

MORE than 1400 members, guests and visitors registered at the four-day convention of the American Society for Testing Materials, at the Hotel Stevens, Chicago, from Tuesday to Friday of last week. The program embraced more than 100 papers, committee reports and addresses, in addition to two extended symposiums, and occupied 16 sessions. As in previous years, the subject matter presented had to do primarily with the development of specifications covering all manner of construction and industrial materials and test data supporting this work. An exception to the usual program prevailed on Thursday evening which was devoted to a discussion of the economic value of specifications from the standpoint of both the vendor and purchaser in a joint session of the A.S.T.M., with the Western Society of Engineers. The speakers at that session included John Brunner, manager of the department of metallurgy and inspection, Illinois Steel Company, and P. Parker, chief engineer, Pullman Car & Manufacturing Company.

One of the most ambitious projects brought to a head by the convention was a symposium on the effect of temperature on the properties of metals which was preprinted in a book of 620 pages. This embraced 28 papers, discussions and notes covering almost every conceivable phase of the subject as applied to metallurgy, manufacturing and power generation. Two sessions were devoted to the presentation and discussion of these papers. The Edgar Marburg lecture this year was given by Dr. A. Nadai, research engineer of the Westinghouse Electric & Manufacturing Company, who read a paper on the Phenomenon of Slip in Plastic Materials.

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(*Continued on page 16*)

A. S. T. M. Holds Convention at Chicago

Large attendance at thirty-fourth annual meeting embracing sixteen sessions in four days

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Accountants Meet at Chicago

R. A. O. A. convention emphasizes accurate accounting as good-will builder—Progress in simplification and adoption of modern methods

THE Railway Accounting Officers Association held its forty-third annual meeting at the Palmer House, Chicago, on June 23-26. Attendance totaled 247 members and 209 guests, as compared with 310 members exclusive of guests present at last year's convention, a comparison which may be regarded as quite favorable in view of prevailing conditions. The association elected as its officers for the ensuing year the following: President, H. S. Palmer, vice-president, N. Y., N. H. & H.; first vice-president. W. B. McKinstry, comptroller, Central of Georgia; second vice-president, W. C. Carrick, general auditor, Richmond, Fredericksburg & Potomac; secretary (re-elected), E. R. Woodson. Buffalo, N. Y., was chosen as the next place of meeting.

G. J. Bunting

As usual the association published in advance of the meeting its comprehensive Agenda covering all committee reports, etc. In view of the wide distribution of this published volume, no attempt is made here to go into any considerable detail in republishing recommendations published in full therein. Rather, this account concerns itself with discussions arising in the presentation of reports contained in the Agenda, official action taken on them, last minute changes and other information which was presented on the floor of the convention, and other items of business transacted which were not scheduled with definite recommendations in advance.

The first day of the convention was devoted, as usual, to meetings of the various committees which were open to members of the association. The meeting proper was opened on the morning of June 24 with the retiring president, G. J. Bunting, vice-president of the Illinois Central, in the chair. After the invocation, George S. Dalgetty, assistant business manager of Northwestern University, delivered an address on how to run a city. This was followed by a short talk on the plans for Chicago's "Century of Progress" World's Fair to be held in 1933 by Dr. Robert D. Shepard, representing the administration of the fair. Following this, Thomas L. Marshall, attorney of Chicago, addressed the convention on the subject of income taxes. He developed his subject historically, both from a legal and accounting point of view, showing how fundamental principles were being developed in such taxation and citing important legal cases which have determined present practices in the imposition and collection of state revenues of this character.

The last feature of the morning session was the address of President Bunting, who outlined the work of his office during the year of tenure and made certain recommendations as to the future of the association. He told of the appointment of a committee on accounts for the railways of Mexico, stating that their problems were essentially different in many respects from those of the railways of the United States and Canada, so that a special committee to deal with them was appropriate. He announced that committees had been appointed to confer with state and federal regulatory authorities looking to the simplification of their accounting and statistical requirements and that such efforts should be continued. He favored the appointment of a committee on accounting for bus, truck and air. operations. He expected the development of a community of interest between all forms of transportation and believed that a committee such as this could foster the contribution on the part of the association toward the development of this community of in-

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terest. He favored some kind of publication to acquaint the membership regularly of important actions taken by the executives and other committees.

He called attention to the national celebration of the bi-centennial of the birth of George Washington which is to occur throughout the country during 1932 and urged the appointment of a committee to arrange some feature at the next convention of the association to commemorate this anniversary. He dwelt at some length on the subject of uneconomic competition on the part of other forms of transport which are to a large degree supported by the taxpayers and in this connection he quoted considerably from the analysis of the present railway situation made by Horatio L. Whitridge of the stock exchange firm of J. S. Wilson, Jr. & Co., of Baltimore and which was reprinted almost in its entirety in the *Railway Age* of February 21, February 28 and March 7.

In conclusion, he pointed out that the railways have never been without unsolved problems and that there is plenty to be done in the solution of such problems at the present time. He advised the members to avoid extreme pessimism, without at the same time becoming thoughtless "Pollyannas". The morning session was closed by the reading of memorials to deceased members and the sounding of taps by a bugler from Fort Sheridan.

Importance of Accounting in Depression Period

At the opening session communications were read from a considerable number of members and invited guests who were unable to be present. Among these was one from Commissioner Eastman who mentioned the subject of the proposed revision in the classification of accounts which has been hanging fire for a considerable period and expressed the hope that the commission would be able to speak officially on this subject before long. A letter from A. J. County, vice-president of the Pennsylvania, stressed the importance of accounting in a time of depression when so much depends upon a close control of all expenses and when executive officers and, indeed, the entire business world, are awaiting with such eagerness information regarding the detailed results of railway operations.

The secretary was asked to read from the Standards Yearbook of 1931 issued by the United States Department of Commerce a succinct account of the function and accomplishments of the association. The members of the committee on accounting of the Mexican railways were introduced to the convention. The members of this committee are as follows: I. J. Terroba, general auditor, National Railways of Mexico, M. Merino, general accounting, The Mexican Railway, and O. W. Borrett, vice-president and controller of the Mexico Northwestern. A gavel for the use of the presiding officer of the association was presented by secretary Woodson. This gavel Mr. Woodson had made of a timber taken from the White House last year where it had been in service for over one hundred years.

Election of Honorary Members

The first committee report to be presented to the convention was that of the Executive Committee, which was adopted as published in the Agenda of the meeting, with the exception that a number of additional names were proposed and approved for honorary membership in the association. The complete list of the new honorary members is as follows: J. M. Rosevear, former general comptroller, Canadian National; A. Hermany, former assistant general auditor, Chicago, Rock Island & Pacific; G. E. Hustis, former comptroller, Delaware, Lackawanna & Western; F. W. Main, former auditor of freight overcharge claims, Chicago, Rock Island & Pacific; T. M. Prentice, former assistant to comptroller, N. Y., N. H. & H.; C. S. Sikes, former comptroller, Pere Marquette; J. I. Morrison, former comptroller, Lehigh Valley; John Hurst, former assistant comptroller, Pennsylvania; J. W. Orr, former assistant comptroller, Pennsylvania; O. F. Giffin, former auditor passenger accounts, Southern Pacific; W. H. Williams, chairman of the board of the Wabash; A. P. Ottarson, former comptroller, Nashville, Chattanooga & St. Louis; H. B. Ochiltree, former auditor freight accounts, Union Pacific; Philip J. Reilly, former auditor passenger accounts, Erie; C. P. Crawford, former comptroller, Erie. It was reported that the association, as of April 29, 1931, had 1,094 active members, representing 457,859 miles of railroad and also certain express companies and water carriers.

General Accounts Committee Makes New Recommendations

The report of the Committee on General Accounts was presented by G. E. Bissonnet, general auditor of the Union Pacific, chairman pro tem of the committee, in the absence of F. P. Johnson, vice-president of the Missouri Pacific, chairman. The report was adopted virtually as published in the Agenda, with the exception of the third, sixth and tenth subjects, which had to do respectively with the reduction in the requirements for valuation accounting, pension accounting and the recognition of cars as rebuilt for settlement purposes. In connection with the reduction in the requirement for valuation accounting, the committee reported that this question had been referred to the Association of Railroad Executives and needed no further consideration by the Railway Accounting Officers Association. On the subject of pension accounting, the committee announced that its special committee on this subject had been discharged and the question dropped from its docket. The committee presented a report on the recognition of cars as rebuilt for settlement purposes based upon a conference between its sub-committee on this subject and representatives of the Mechanical division of the American Railway Association. Chairman Bissonnet explained that the thought was that the basis for decision should be the physical condition of the car as mechanical department officers find it to be and that accounting questions do not enter.

The committee reported on efforts being made to simplify and curtail statistics required by governmental authorities, in particular wage statistics. Chairman Bissonnet said that these statistics are some of the most expensive which the railroads have to compile and that on all actions where wage questions come up for negotiation more and more data are sought, hence the necessity for effort to reduce the requirements. The committee reported that it was continuing the subject of revision of the Interstate Commerce Commission accounting classifications on its docket—the decision of the commission on this question not yet having been announced. Another subject dealt with by the committee also clarified questions which have arisen in reporting the number of unserviceable locomotives.

Arbitration Fee Set at $15

The report of the Committee on Freight Accounts was presented by W. H. Malcolm, auditor of freight receipts of the Missouri Pacific, in the absence of Chairman E. H. Bridger, auditor of freight and telegraph receipts of the Canadian Pacific. Considerable

discussion developed on the committee's recommendations regarding uniform rules covering the issuance and accomplishing of bills of lading which the committee reported upon favorably after conference with the Railway Treasury Officers Association, and the Freight Station Section of the American Railway Association. Mr. Bissonnet objected to action on these rules on the part of the accounting officers on the grounds that they were the business of the operating and traffic departments. However, it was pointed out that the rules were promulgated by the treasury officers, that they are not mandatory and that the R. A. O. A. freight committee simply approved them in so far as the accounting features were concerned. Substitute rules were offered for Freight Mandatory Rules No. 149-167, inclusive, in "Railway Accounting Procedure" and a detailed treatise on stating division basis on abstracts was presented to be placed in the "Freight Plans and Methods" section of "Railway Accounting Procedure".

A lively question arose regarding the committee's recommendation that the fee for each arbitration or appeal submitted to sub-committees be raised to $15, so that each of the three members of such committee should receive $5 for his work on it. The opposition to this proposal was lead by Mr. Bissonnet, who characterized the fee as an "outrage". He said that the railroads were suffering from too much arbitration. Members of the committee, however, pointed out that men assigned to these arbitration cases were forced to spend a considerable amount of their own time outside of office hours in studying these cases. They held that this work was a special service to the railroads appealing for it and should be charged for in order to encourage the railroads to settle their difficulties themselves rather than burdening outside persons with their problems.

President Bunting pointed out, however, that there had been only 25 such cases in the past ten years. There seemed to be general agreement with the proposal that there should be a fee of sufficient size not to encourage too greatly the resort to arbitration or appeal. Mr. Bissonnet agreed to withdraw his objection to the committee's proposal if the fee were raised even higher than $15. Accordingly it was agreed to fix the charge at $25, each of the three members serving on such a committee to receive $8 of this and the R. A. O. A. $1. On the sixty-third subject considered by this committee, i.e., printing notices on freight bills and arrival notices requesting the consignees to completely unload the cars, the committee changed its recommendation from the form in which it appeared in the Agenda of the meeting, deciding to carry the subject on its docket for future consideration, instead of dismissing the proposal. With the exceptions noted above, the report was adopted as read.

At the closing session, however, on motion of A. J. Moran, assistant comptroller of revenue of the Erie, the convention reversed its decision on the arbitration fee question and restored the fee to the $15 originally recommended by the committee, the committee to consider during the coming year whether or not the fee should be raised to $25.

How Credit Receipts for Autos Shipped for Passengers?

The report of the Committee on Passenger Accounts was presented by Chairman C. P. Coleman, auditor of passenger accounts of the Texas & New Orleans. A question was raised regarding changing the wording in "Railway Accounting Procedure" to take cognizance of the change in the method of handling express business by the Railway Express Agency. The committee made a recommendation in line with this subject which, however, was corrected by a motion from the floor to include also the crediting of revenues received where the express business is handled directly by the railroads without the intervention of an outside agency or company. The report of the committee was adopted as it appeared in the Agenda with the exceptions noted above.

In discussing the report, however, the question was raised as to proper accounting methods for revenue received from the transportation of automobiles in passenger movement. A number of railroads have passenger rates whereby for the purchase of five tickets the railroad undertakes to transport two passengers and one automobile, the three tickets representing the charge for conveyance of the automobile. In some cases these automobiles are handled in passenger service and some times in freight service. There was no question that when the automobiles were handled in passenger service that the revenues should be so credited. But there was some difference of opinion as to receipts from this source when the automobiles were handled on freight trains.

Extensive Report by Disbursement Committee

Chairman H. B. Anderson, auditor of disbursements of the Seaboard Air Line, presented the report of the Committee on Disbursement Accounts. He announced that the committee had held two meetings during the year, one of which, at St. Louis in December, was attended by all the members and also by President Bunting of the R. A. O. A., Assistant Director of Accounts Fred A. Barnes of the Interstate Commerce Commission and accounting representatives of the various St. Louis railroads. One of the features of the report of this committee was its presentation of a form for reporting the cost of ice and salt in bunkers of cars, giving new forms for reporting these items of expense as a substitute for those not appearing in "Railway Accounting Procedure" in paragraphs 880-883 inclusive. The committee also submitted a detailed treatise on the subject of the use of accounting machines in disbursement work for inclusion in "Railway Accounting Procedure". This treatise occupied 32 pages in the printed Agenda and had as its purpose the bringing completely up to date the functions and practices in the utilization of the most modern accounting machinery in the reduction of accounting department expenses, combined with greater accuracy and speed. The committee also submitted new rules covering joint facility bills.

Some question was raised regarding the recommendation it made for accounting for a pension to a joint employee whereby road "B" agreed to accept a bill covering its proportion of the pension granted to a joint employee carried on the payroll of road "A". The committee ruled that road "A" should credit the amount to the "General Joint Facilities—Cr." account and road "B" debit the amount to the "General Joint Facilities—Dr." account. There was some feeling that such a payment should be charged to pensions rather than to joint facilities.

The committee reported on a question regarding proper accounting for the operating of trucks used for handling stores department material, giving the proper accounts to which repairs, depreciation, drivers' wages, oil and gas, tires and license tax should be charged. Supplementary to this recommendation, as it appeared in the Agenda, it also answered a question on the subject of the proper account to which to

charge taxes on gasoline or oil, its recommendation being that such expense should be charges to the "Railway Tax Accruals" account. The report was adopted.

In connection with the report of this committee, a paper on the subject of centralized accounting, prepared by J. C. Wallace, general auditor, Cleveland, Cincinnati, Chicago & St. Louis, was read, in Mr. Wallace's absence, by B. A. McManus, auditor of disbursements of the Chicago & North Western. This paper, which stressed the advantages of centralized accounting and the use of modern machinery in promoting savings and accuracy, will be published in abstract in a subsequent issue of the *Railway Age*. The reports of the Committees on Terminal Companies' Accounts and on Water Line Accounting, were presented and adopted without discussion.

Prevention of Overcharge Claims

Chairman W. D. Steele, auditor of revenues of the Seaboard Air Line, presented the report of the Committee on R. A. O. A. Overcharge and Agency Relief Claim Rules. This committee reported on twenty-three subjects and the chairman urged the co-operation of the accounting officers in the work of the territorial claim conferences. In connection with the report of this committee a paper on the subject of the prevention of overcharges and undercharges was presented by H. C. Holzbach, auditor of freight accounts of the Chicago, Burlington & Quincy. An abstract of this paper follows:

Prevention work may be classified under five headings; that is, tariffs, individual responsibility, classification, accounting, and general, and the following are offered along these lines:

Freight Rates Must Be Simplified

Closer co-operation between the accounting and traffic departments of all carriers with the view of simplifying the general rate structure is an end earnestly to be sought. There has been a continuous drive during the past few years towards the simplification of freight rates and much good has been accomplished. Nevertheless, much remains to be done. In every rate territory conditions exist whereby rate clerks are required to figure three or four rates in order to establish the lowest applicable rate, to say nothing of the alternative application of rates in various tariffs, all of which have a tendency to cause misapplication of rates and results directly in overcharges and undercharges. Many carriers have assigned traveling tariff and rate inspectors whose duties consist of checking the tariff cases to be assured the necessary tariffs are on file, also in test-checking received and forwarded business and going over rate questions with the station forces. This personal contact between the inspectors and the agents and agency forces has a tendency to create an interest in prevention work.

Individual Responsibility

The most effective results of prevention work are obtained through the establishing of individual responsibility for preventable errors, this being placed in both the audit office and agency forces. This can and is being accomplished by taking extra copy of each correction made in the audit office and the use of a special form in connection with errors developed through claims, and the issuance of monthly statements by stations indicating the number of chargeable errors as compared with the number of freight bills issued for the same period.

It is found that the circularization of such data as constructive criticism creates a spirit of competition among station forces which reacts through the desire to do better and more effective work.

Classification

The education of all agents and receiving clerks in the necessity of shipping orders and bills of lading being properly prepared with the description and packing of articles shown in terms of the classification and information inserted when not shown is most essential. Investigation has developed that a large percentage of claims is chargeable to erroneous use by shippers of trade names not listed in the classification of articles on bills of lading and shipping orders. Another cause is failure to show on bills of lading how shipments are packed; that is, knocked down, knocked down flat, set up, crated, boxed, wrapped, etc. Other causes are: Failure to indicate released valuations where the rate depends upon the value declared; use of estimated weights by shippers not members of or having agreement with weighing bureaus. Shippers may assist materially in this program and much good can be accomplished by calling these omissions to their attention.

Accounting

Most effective work can be done in the prompt, correct revising of waybills, which should be done, if possible, before the freight bill is rendered to the consignee. The issuance of legible waybills and the rendering of legible freight bills at destination will eliminate the presentation of many claims. Numerous claim bureaus use the imperfect and illegible freight bill as the basis of filing claims for alleged overcharges.

General

The proper insertion of rates and charges at the source and at the rate breaking points would eliminate a large number of overcharges and undercharges which now exist. Sufficient care is not being exercised by billing clerks to apply correct rates. There is also failure at rate breaking points to insert on waybills the rates beyond such points, particularly where combination rates are used in connection with through billing.

The prevention of overcharges and undercharges rests primarily with the freight accounting officers as it is a fact that the officer in charge of overcharge claims is only able to deal with such items as come to his attention through the medium of claims.

The various territorial claims and accounting conferences are proving very beneficial to our membership, and freight accounting and overcharge claim officers are earnestly urged to attend and take an active part in these meetings. These meetings are usually held in large cities, frequently the terminals of many carriers and every effort possible should be made to permit the rate and station forces to attend the meetings, if possible, as a matter of education.

Accurate Accounting an Aid in Meeting Competition

In a discussion of this report, which was adopted without change, and Mr. Holzbach's paper, it was pointed out that proper accounting in the elimination of overcharges and undercharges was an important step in the meeting of competition of truck lines. Friction with shippers and too-exacting railroad requirements as to crating, etc., and the multiplicity of rates and difficult accounting had a strong tendency to revert traffic from the rails to the highways. The Committee on Valuation Accounting had no report to make, since no questions were referred to it during the year.

A. L. Conrad, assistant general auditor of the Atchison, Topeka & Santa Fe, presented the report of the Committee on Statistics, in the absence of J. C. Wallace,

chairman. The committee reported on one subject and announced that one other had been referred to it since the publication of the Agenda. It was moved and carried that the report of this committee be adopted with the thanks of the association "for not burdening us with a lot of statistics". Short reports were presented by the Committee on Accounts of Class II Carriers, of that For Conference With the Railway Treasury Officers Association and of that For Conference with the American Association of Passenger Traffic Officers. The Committee for Conference with Division V, Mechanical, of the American Railway Association, had nothing upon which to report.

Urge Closer Relations with Regulatory Bodies

Charles A. Lutz, vice-president of the Railway Express Agency, presented the report of the committee appointed to attend the convention of the National Association of Railroad and Public Utilities Commissoners. In addition to the formal report of the committee, which appeared in the Agenda for the meeting, Mr. Lutz discussed this convention informally, reporting, in general, a sympathetic attitude as to the present difficulties of the railroads in their facing of competition from subsidized competitors. In discussing Mr. Lutz' remarks, there were apparently many of the opinion that closer relationships should be developed with regulatory authorities, approaching them on a frank, out-spoken and business-like basis, showing clearly the railways' position and co-operating fully with the authorities to the end that a better understanding might result which would be of mutual benefit to both the railways and the task of their regulation.

On motion of F. J. Fell, vice-president of the Pennsylvania, the association decided to create a committee on accounts of bus lines, trucks, and air transportation. On motion of G. J. Bunting, vice-president of the Illinois Central, it was decided to have the Committee on Accounts of Railways in Mexico serve as a special committee during the ensuing year, and a notice was given for making that committee a permanent committee beginning next year. W. C. Wishart, vice-president of the New York Central, told some of his experiences in attending the International Railroad Congress in Madrid.

J. J. Ekin, comptroller of the Baltimore & Ohio, in the course of an informal talk, pointed out the necessity of the accounting officers taking an aggressive interest and part in railroad affairs, especially at this time. S. B. Goldman, auditor of the Southern Pacific of Mexico, made a motion that hereafter the meeting room of the association be decorated with the flags of all the countries represented in the association. This motion, after considerable discussion, was defeated for the reason that the flags would be too numerous. The action of the committee taken was to leave to the committee in charge of the convention the matter of decorations. There was, however, throughout the discussion an underlying suggestion that at each convention flags should be displayed of every country represented at that convention.

THE SOUTH AFRICAN RAILWAYS have decided to proceed with the electrification of their line from Pietermaritzburg (Natal) to Cato Ridge, 28 route miles and 41.9 track miles. The completion of this work, which is estimated to cost £76,020 (about $380,000), and which represents one section of the proposed Pietermaritzburg-Durban electrification, will bring the total continuous length of electrified line in Natal to 200 miles. Daily traffic over the section in the ruling direction is about 23,000 tons, while under electric power it is estimated that 30,000 tons can be easily handled.

Elisha Lee Optimistic on Future of Railways

LOOKING, as he said, beyond this present emergency, Elisha Lee, vice-president of the Pennsylvania, viewed the railroad future with "distinct optimism" in the course of an address delivered on June 25 at Boston, Mass., before the Thirty-Sixth Annual Convention of the National Association of Credit Men. Mr. Lee based his confidence on the belief that the people of this country "are intelligent enough and far-sighted enough to sanction the steps necessary to introduce financial and economic stability into a form of enterprise which they are absolutely unable to do without."

Some necessary developments, he continued, are already taking form while others lie in the future. Mr. Lee summarized the desirable steps as follows:

1. Definite recognition of the railroad companies as general carriers, not merely limited to the rails.
2. Entrance by the railroads into every field of useful transport, by land, air, waterway, lake or sea, and in both domestic and foreign commerce.
3. Utilization of each agency of transport in the field in which it is able to give the public that service which, all things considered, is best and cheapest, and its development within the reasonable limits of such field.
4. Voluntary consolidations of railroads as contemplated by the Transportation Act, for which the groundwork has already been laid in the eastern territory.
5. As a sequel of consolidation, the progressive adoption of many operating economies, largely through elimination of unnecessary competition, and particularly those forms of competition not required to sustain initiative.
6. Limitation of competition strictly to service, with complete protection of the rate structure from the reach of competitive influences, direct or indirect.
7. Non-competitive pooling of traffic and service, by merger or otherwise, in various limited areas where the volume of business is not sufficient to support competing operations.
8. Withdrawal of the government from all forms of subsidized competition against the railroads, as being unsound, unfair, against public interest, and out of harmony with the spirit of our laws and institutions.
9. The exercise of reasonable control over the too rapid creation of further facilities for the rendering of commercial transport, beyond the requirements of tangible needs.
10. A permanent policy of rate regulation which will comply with the provisions of the Transportation Act, calling for a reasonable return to the railroad companies upon their property devoted to railroad use.

Intelligent fostering of the foregoing plan, Mr. Lee predicted, would accomplish "an orderly evolution in transportation, which is what we wish to bring about—not a subversive revolution."

In opening his remarks, Mr. Lee discussed the friendly relations between the Pennsylvania and the New York, New Haven & Hartford, before turning to a discussion of railroad affairs at large. The pending application for increased rates, he said, "far transcends in importance any other internal economic issue before the country today," and "presents to the regulative bodies, both federal and state, an opportunity never surpassed in history to demonstrate their grasp upon the principles of transportation statesmanship."

THE YUGOSLAVIAN STATE RAILWAYS, according to the Times (London), have received bids on the construction of three new standard-gage branch lines, running from Koprivnica, in northern Croatia, to Varazdin, 26 miles; from Priboj to Prijepolje, 17 miles, and from Sv. Janz to Sevnica, 7.5 miles, connecting the Karlovac district with the main Zagreb-Ljubljana-Vienna line. All three lines are to be built on the long-term credit system used by the government for all important works, under which the contractor finances the construction himself and is paid in interest-bearing government bonds.

Reciprocity Quiz Swings To Detroit

Michigan Central methods discussed at I. C. C. investigation of railway purchasing and traffic—Coal brokers chief subject

WHILE the Federal Trade Commission is considering the arguments recently made before it on the fairness or unfairness of alleged alliances between draft-gear manufacturers and Chicago meat packers to use traffic to influence railway purchases, the Interstate Commerce Commission again resumed the reciprocity investigations which it has been conducting since September, 1930, with hearings in Detroit on June 24-29. The hearings were held before W. B. Bartel, director of the Bureau of Service, and were a continuation of the investigation of the New York Central lines begun last March in New York. B. A. Aikens, purchasing agent, O. R. Bromley, traffic manager, and N. J. Brennan, assistant general freight agent of the Michigan Central, were questioned at the hearings, and over 2,000 pages of correspondence and statistical documents were added to the several thousand pages of evidence already in the commission's record concerning the activities of the roads. The correspondence on the Michigan Central transactions came chiefly from the files of the traffic department. About 1,800 of the letters related to fuel purchases and negotiations with 70 firms, while approximately 200 letters dealt with miscellaneous purchases. The names of 70 executive, traffic, purchasing and other officers of the New York Central lines appeared in the letters.

A large number of the letters showed that the road was being solicited for purchases on a traffic basis by shippers. Typical statements from shippers soliciting coal orders were as follows:

> Neither concern was given any of the Michigan Central fuel, and the Globe Coal Company, in particular, is considerably exercized and has arbitrarily diverted many cars of anthracite . . . The Lehigh Valley Coal Sales Company . . . have threatened to divert some of the anthracite tonnage from us.
>
> The Dykstra interests, the same as a large percentage of the balance of the coal industry, are at all times telling us how much business they are giving us and on that basis soliciting our coal tonnage.
>
> With the increased tonnage which we are showing . . . your road will benefit considerably more during 1928 if we get a fair proportion of fuel coal in return.
>
> When we route coal via a certain line, we expect some consideration in the apportionment of their fuel coal.
>
> Chase & Woodruff, who are very good friends of the Michigan Central and gave us a large coal tonnage, are diverting all of their coal from us, owing to our not placing part of our contract with them for company fuel.
>
> A little reciprocity on your part will go a long ways with us.
>
> Frankly, we want to do business with your company . . . and at the same time we feel that we should receive some consideration. We want an order . . . for not more than 100.

Sears, Roebuck and Coal

The letters brought out that Sears, Roebuck & Co., had entered the coal business and also solicited purchases from the Michigan Central. In one of several letters on the subject, the coal, coke, and ore agent of the Michigan Central reported that "information regarding Sears, Roebuck entering coal sales game is correct and at the present time sales are very satisfactory, considering the short period it has been under way." Another letter stated:

> Mr. R. H. Manny, coal department, Sears Roebuck & Co., called upon our purchasing agent asking that we buy some fuel from them, to be shipped from Mid-West Fuel Company.

A cast iron pipe company in Birmingham, Ala., the traffic officers of the New York Central lines were informed according to letters introduced in the hearing, "will not permit specific solicitation (of freight) as it has been their policy to favor the roads that purchase from them," while a letter from the traffic department of the Dunlop Tire & Rubber Co., Ltd., of Toronto, Can., notified the traffic department of the Michigan Central in part as follows:

> The sales department has again reported to me that your road is not very anxious to recognize the fact that our inbound car load traffic over your line was over three times greater than the previous year . . . there is nothing left for me but to turn the traffic back to the line who take the routing of cars into consideration.

Purchasing Policies Stated

B. A. Aikens, purchasing agent of the Michigan Central, testified that traffic is considered in the road's purchasing, which amounts to $12,000,000 in round numbers annually, but that quality and price are not subordinated. About 95 per cent of the supplies, he said, are purchased on the basis of competitive bids. Any firm desiring to bid is placed on the inquiry lists, and is not removed for want of traffic. The responsibility of a bidder might not be investigated until bids are received.

The purchasing department does not regularly receive tonnage reports from the traffic department or maintain such records, he said, and does not make a regular practice of notifying the traffic department of its bids or conferring with it when placing orders, adding that large contracts are frequently awarded to firms having no traffic value to the road. He testified, however, that he would confer with the traffic department when in doubt or in need of information, and that the traffic department has volunteered recommendations as to the traffic value of firms for several years.

In competitive bidding for general supplies, he said, firms are allowed to revise their bids for traffic or other reasons, but only one revision is permitted and the low bid is not disclosed. He did not think favorably of having bids opened in public and awarding the business to the lowest responsible bidder, saying it would embarrass the individual bidders and prevent the road from getting the best price. When asked if that situation had attended purchasing made by the road under the Clayton Law, he said no.

Where traffic is considered, he said, purchases are usually awarded on the basis of the past performance of the shipper and not on the promises of future traffic. Competitive prices are compared by including the foreign line's division of the freight to the junction

point with the New York Central lines and adding five mills per ton-mile for the haul from that point. Since 1930, the different lines of the system are paid five mills per ton-mile for their haul instead of the commercial freight rate.

Coal Brokers

The hearing at Detroit centered largely around the road's coal buying, which has been done largely through brokers in recent years. Both Mr. Aikens and Mr. Brennan testified that this was done for traffic reasons. The practice since 1927 has been to purchase the coal from month to month and to distribute the orders among the brokers according to allotments based on the volume of their commercial coal traffic for the previous years. The mine from which the coal is shipped, however, is specified. The prices to be paid and the producers of the coal are now determined at system headquarters. The purchases from brokers, Mr. Aiken stated, are allotted on the basis of six cars of bituminous, or five cars of anthracite to one, and amounted to approximately 60 per cent of the coal purchased previous to 1930, but have been reduced to 10 per cent since 1930.

Compilations of statistics prepared by the commission on the road's fuel activities showed that the coal was furnished by 72 operators in 1928, while 102 firms received the orders for the coal, including 20 of the firms listed as operators. The statement also showed that the number of mines from which individual brokers furnished the coal ranged from 1 to 23, and that of the 20 operators who received orders for coal, only 9 supplied directly all the coal ordered for the Michigan Central from their mines, while 3 operators filled their orders from the mines of other operators. One operator, in addition to supplying Michigan Central coal on his own orders, shipped coal to the Michigan Central on the orders of 20 brokers, while the production of Michigan Central coal from another mine was entirely divided among 23 brokers.

Mr. Aikens agreed that the jobber's commission (usually 10 cents per ton) reduced the price which a producer would get for the coal under the fixed price arrangement, but disagreed that it represented a price that the road paid to get the traffic of the sales agent. The sales agent, he said, was beneficial to the operator. The protests of the mine operators, he explained were against buying from free lance brokers, not authorized agents. He agreed that prior to 1930 coal was purchased through free lance brokers.

Tonnage Reports

Mr. Brennan, assistant general traffic manager, stated that prior to 1927 and 1928 he had circularized brokers and operators receiving coal orders and insisted that they furnish monthly reports of their commercial traffic that would show car numbers and routing but had been instructed to discontinue the practice. Coal shippers continue to volunteer the information, however, and their reports serve as a check upon who should get the credit for shipments where the way bills might leave the point in doubt. While it had been his practice to make recommendations affecting the distribution of orders, he stated that he had not made adverse recommendations because of the failure of firms to report their freight but did not recommend purchases unless he knew the shipper's traffic value. He was asked if he had ever told operators to place their business through brokers as a means of securing coal orders, or prevailed on mines outside of the prescribed coal districts to make connections with mines or brokers producing coal in the prescribed coal district for the same purpose and replied in the negative.

Mr. Brennan was questioned about a letter written in 1928 in which he said in part:

> If you run across any operators who you really think control traffic to any considerable extent we will be very glad to request some of our brokers to try and place their orders with such concerns. It would be my suggestion that you tell such operators verbally to get in touch with brokers in Detroit who you know are selling coal to the MC. You have been supplied with this list from time to time, and you know who they are. In other words we desire to place our orders through brokers in Detroit who can buy their coal from operators in the field, both parties in this way being satisfied. It is not our intention to place any orders direct with operators if we can possibly avoid it, as you will appreciate that we kill two birds with one stone.

Asked if coal dealers could secure orders from the purchasing department unless he recommended it, he replied in the affirmative and testified that the purchasing department might not necessarily follow his recommendations. Upon further questioning by the examiner, he stated that he had overspoken himself in this and other similar letters and had assumed authority he did not have.

He was also questioned about a letter in which a coal dealer thanked him for the receipt of an order from the purchasing department for coal and also thanked him for the receipt of a coal order from another shipper. He testified that he had recommended the Michigan Central order but when asked if he had ever made attempts to get shippers to place orders with friendly brokers he replied in the negative.

He was also questioned about a letter in which a coal dealer stated that if the Michigan Central continued to give him any fuel purchases in the future it should place the orders directly with the mines and instruct them to send the broker a commission, following which Mr. Brennan had informed the coal dealer that he would be governed accordingly. He explained that he did not recall having written operators, notifying them what commission should be paid, but might have done so and testified that it was generally understood that 10 cents was a standard commission. He also testified that it was not his policy to award coal through two or more brokers, and when his attention was called to cases of this kind shown in the statistical statements, he said it had been done inadvertently.

Routing Instructions

His attention was called to a letter written by him in 1928 to the road's coal, coke and ore agent, in which he said in part:

> Carbon Glow representative, Mr. Mondey, Detroit, called us the latter part of last month giving reference to this business, stating that he would route it all via our line, provided we could assure him of any fuel tonnage in August. We agreed to give him 25 cars for the month of August, which we have done.
>
> We, of course, intend to watch the situation, and if it does not all move in connection with our line, Mr. Mondey will have difficulty securing another order.

He testified that he had not encouraged brokers to disregard routing instructions of consignees although, upon further questioning, stated that it was the policy nowadays to do anything to get business providing, as he later qualified, that the methods were not illegal.

Brokers vs. Operators

On February 27, 1928, a coal operator, writing to Mr. Brennan, said in part:

> We occasionally sell brokers our coal, but have no contract

arrangement with them, as most of our tonnage is sold direct and handled through this office, as we cannot afford to stand brokers' commissions in all instances.

We do not feel that we are obligated to ship coal through numerous brokers located in Detroit and other cities through whom we have no other business, and believe that you will appreciate our position in this matter.

Questioned about this letter, Mr. Brennan stated that protests of this character against buying through brokers had come to his attention in only a few cases, but that he understood the policy adopted by the New York Central lines against buying more fuel through free-lance brokers had resulted from protests.

Mr. Brennan referred to considerable correspondence relating to purchases of fuel on the lines of the Norfolk & Western and the Chesapeake & Ohio in 1927, 1928 and 1929. In this was a letter in which Mr. Brennan told the Chesapeake & Ohio that "we control the placement of this fuel and increased the amount during April in order to help out certain operators on your line. If we can secure results, we are generally going to continue to place our fuel where it benefits us." He testified, however, that the Michigan Central has begun buying coal south of the Ohio river because of a strike and that little coal is now purchased off the lines of the New York Central. In reply to questions concerning letters indicating an agreement with officers of the Chesapeake & Ohio to route unrouted traffic over the Michigan Central in return for orders placed with operators on the C. & O., he disclaimed that such an agreement had been made. Questioned about a letter in which he had reported that the C. & O. "was again campaigning for the Ann Arbor railroad by inserting that routing where consignees had specified the Michigan Central, he did not recall that the Michigan Central had ceased buying on the lines of the Chesapeake & Ohio at the time but recalled that the Ann Arbor had placed orders in that territory."

Mr. Brennan was also questioned concerning letters stating that one of the traffic agents had visited the scales on the Chesapeake & Ohio at Russell, Ky., and insisted that this information and similar information obtained on the lines of the Norfolk & Western was not obtained from the railroad, which he knew was prohibited from divulging such information, but was obtained from the forwarding agents of the mines.

Since several of the traffic letters dealt with the quotations of coal operators on Company fuel, Mr. Brennan was asked if traffic solicitors were authorized to secure bids on coal and replied in the negative. He also testified that he had no authority to negotiate with brokers or operators directly about orders placed for fuel, although several letters showed that this had been done.

Material Prices

Mr. Aikens was referred to correspondence on fuel purchasing and traffic, written in 1922 to 1924 and in reply to questions stated that the policy of reciprocity had started about 1924, and had been advocated by the traffic department. He said that the question of going back to yearly contracts had recently been discussed, but stated that, except in two or three instances, the fuel buying of the Michigan Central is still being conducted on a spot basis, although yearly contracts would be more convenient for the purchasing department. He stated that the Michigan Central had never stored coal to help jobbers but because of coal strikes. He also explained that the operators from whom coal is obtained, and the mine, are designated by the purchasing department, in accordance with lists prepared by the vice-president of purchases. Questioned concerning several letters in which quotations had been made for coal, he stated that while prices were sometimes quoted lower than the fixed price allowed for the coal, he was of the opinion that the prices paid by the Michigan Central for its coal have been very favorable under the circumstances. He explained that coal orders were sometimes issued with undetermined prices during the period when the standard price was being decided upon but that such orders were all issued subject to the fixed price.

Waybills and Coal Prices

Mr. Bromley was questioned about instances which had come to the attention of the commission where coal for company use had been shipped to destinations other than those marked on the waybills and which, if billed to the actual destination of the coal, would have increased the division of the through rate which the road would have had to pay for the coal movement. Attorney M. C. List referred particularly to four locations where this had occurred. Mr. Bromley testified that that he was not aware of any infractions in the billing of company coal outside of one of the cases at St. Thomas and had prohibited its continuance when it was called to his attention by the commission.

A. S. T. M. Holds Convention at Chicago

(*Continued from page 8*)

ture in Concrete, which also contained an excellent review of the principles involved in the use of all classes of admixtures.

The Committee on Timber offered revisions in the clauses relating to dehydration and distillation of the Standard Method of Test for Distillation of Creosote Oil. These changes were the cooperative work of this committee and the Committee on Preservatives of the American Wood-Preservers' Association and were recommended for immediate adoption. Except for recommendations to the effect that three tentative standards be continued as tentative for another year, the committee had no other suggestions to offer.

In addition to a report on some refined tests of ductility for roofing materials, the Committee on Waterproofing and Roofing Materials submitted a Revised Tentative Method of Testing Asphalt Roll Roofing Surfaced with Talc, Granular Talc or Mineral Granules, and Asphalt Shingles Surfaced with Mineral Granules.

The Committee on Preservative Coatings for Structural Materials recommended that the Tentative Standard Specifications for Boiled Linseed Oil be continued as tentative for another year, and recommended for adoption as standard the Tentative Standard Specifications for Aluminum Powder for Paints and the Tentative Standard Specification for Gold Bronze Powder. The report also contained proposed tentative standard specifications covering eight cellulose coatings and two tentative standard methods of test. One of the latter, covering tests of the tinting strength of pigments, was supported by a report of some tests conducted in 10 commercial laboratories.

Revisions of five tentative standard methods of testing insulating materials were offered by the Committee on Electric Insulating Materials, which also recommended the advance to standard of the tentative revisions of the Standard Method of Testing Electrical Insulating Oils.

Improving Transportation Methods

Abstracts of five papers and reports presented at the convention of the Superintendents' Association

Part II

A CONDENSED report of the thirty-eighth annual convention of the American Association of Railroad Superintendents, which was held at St. Louis, Mo., on June 9-12 was presented in the *Railway Age* of June 20. Among the reports and papers referred to therein were those dealing with problems of terminal operation; the use of car retarders, especially in small yards; and the solicitation of business by employees; the elimination of interchange car inspection and the importance of analyzing railway facilities to determine needed improvements. These reports and papers are abstracted below:

Terminal Operation

The committee on interchange car inspection, of which A. M. Umshler, superintendent of terminals, Illinois Central, Chicago, was chairman, reported on three subjects: Yard Air Lines, Triple-Crewing of Yard Locomotives, and Avoidance of Delays to Transfer Locomotives in Interchange. Its reports in part follows:

Yard Air Lines

In most large yards where trains are made ready in advance, for either road or transfer crews, yard air lines are indispensable. On the other hand, in small yards where transfer crews take the cars out about as fast as they are switched, coupling up their own tracks and charging the air with the locomotive, air lines are not necessary or economical, whereas in small yards where trains are made ready for road movement, yard air lines are desirable and economical, even though not required for each train. There are many instances, even in a small yard, where road locomotives cannot be obtained as soon as a train is lined up, and then the yard air should, by all means, be used to get the train ready for movement so that it can depart promptly when the road locomotive arrives. There are few things that demoralize a yard more than to have a road locomotive working its own air on a train, with a bad order car or two to set out, for it practically ties up the yard until the train departs.

Yard air is also economical for the mechanical department because it permits that department to operate with a uniform force, instead of requiring additional men to inspect trains rapidly after the locomotives arrive. If a train is properly prepared for service with the use of yard air, only two men are needed to make the proper air tests when the locomotive is coupled.

With the use of yard air, many minor defects can be remedied which should result in cars being set out if not discovered until leaving time. Trains of 100 cars or more can be pumped up to the required train line pressure in a short time, if the yard air is left on the train until a few minutes before the locomotive is coupled on. With yard air, a train of 100 cars should depart in not to exceed 10 or 15 min. after the locomotive is attached.

Triple-Crewing of Yard Locomotives

There is no question, in the committee's opinion, but that the triple-crewing of yard locomotives is economical and very successful. Roads using electric, oil-electric or oil-burning steam locomotives, find the problem a simple one, while with roads using coal-burning steam locomotives, the economy of triple-crewing depends upon whether there are a sufficient number of inside yard locomotives in operation to justify the expense of employing relay crews to handle locomotives to and from the enginehouse.

Triple-crewing of locomotives reduces overtime, reduces dead time in moving locomotives to and from the engine terminal, avoids congestion at the enginehouse and makes it possible to maintain practically continuous service, and operate the locomotive at maximum efficiency. Where the quality of coal is such that it can be done, the fuel capacity of tenders can be increased to carry a 24-hr. supply, and triple-crewing of locomotives can be handled without relay crews. On some roads, however, the locomotives cannot be operated for more than 16 or 18 hr. without taking coal.

Interchange Delays to Transfer Locomotives

In recent years there has been a very marked improvement in the handling of transfer locomotives on foreign lines. This has been effected simply by insistence that yardmasters treat foreign engines in the same manner that they would their own. In fact, the foreign engine should be given a little better consideration than a home engine because it is usually in the way until it departs for the home yard. The day when a foreign locomotive was put into the clear on a track, and held there sometimes for hours, is past.

There should be a regularly listed time for transfers operating into foreign yards so that the receiving line can expect them about the same time every day and make arrangements for their reception—have a clear track available, see that the caboose can be obtained readily, and if the engine takes a train back, see that the train and the train bills are ready so that it can depart with the least possible delay. In many cases arrangements can be made to handle the caboose of the train that was brought in with much less delay than if the foreign locomotive is required to handle it and then put it on the train that it takes out of the departure yard. If any extra transfers are run or any unusual movements made, the receiving line should be notified promptly so that it can be given an opportunity to make arrangements to receive the extra transfer.

Two railroads in a middle-western city have effected an operating agreement under the terms of which a locomotive of the delivering line arriving at the connection switches becomes the locomotive of the receiving line, and all detention from the time of its arrival until its return to the owning line's rails is chargeable to the receiving line. Cash settlement is made at the end of each month for excess hours at the rate of $12 per hour. This arrangement has resulted in a great saving to both of the railroads concerned and is a practice that might be utilized to advantage at any points where conditions are serious enough to require it.

Discussion

In the discussion of this report, which was presented by H. F. Sutherland, (K. & I. Term.), Mr. Sutherland stated in reply to several questions, that the success attained in the plan described for reducing transfer time was due to the principle that, to all practical purposes, the delivering locomotive becomes the property of the receiving line when on its rails, in every respect except as regards engine failures. This plan was described in some detail in the *Railway Age* of December 27, 1930. In reply to another question regarding the alternating between roads of responsibility for all interchange for given periods, Mr. Sutherland stated that it had been his experience that each line, in its period of operation, runs up the charges to get even with the other line.

Referring to yard air lines D. L. Forsythe, (S. L.-S. F.), stated that this facility had reduced terminal

delay 25 per cent on his line. This road has also attained marked success in double and triple-crewing both oil and coal-burning yard locomotives. At some points remote from the enginehouses, hostlers take fresh locomotives out to the point of service at intervals of 24 hr. This practice effects marked savings in fuel.

Car Retarder Operation

The effect of the use of car retarders on the efficiency and the cost of operation of hump yards were covered in a report prepared by a committee of which N. A. Ryan, division superintendent, C. M. St. P. & P., Milwaukee, Wis., was chairman. The report read in part as follows:

In addition to the large savings in cost, other advantages and economies that may be obtained by the installation of car retarders are:

1. The ability to keep a yard open and functioning under all weather conditions.
2. The elimination of tracks, motor cars and expensive concrete subways for returning riders to the hump, or the utilization of such tracks for classification.
3. The capacity of the hump is increased. All delays caused by waiting for riders to return to the hump are eliminated.
4. Damage to lading and equipment through rough handling is reduced, in fact almost totally eliminated.
5. Personal injuries to employees are reduced.
6. Damage to equipment is practically eliminated.

Since the pioneer installation on the Indiana Harbor Belt at Gibson, Ind., in 1924, many large yards have been rearranged and retarders installed, and the yards generally modernized. We have been unable to find one case where the modernization of these yards has not effected all the economies that were anticipated. It has taken some time after the installation has been completed to obtain smooth operation, but that is only natural considering the radical changes which are necessary to cut in a retarder hump and place it in operation.

It would be a waste of time to burden the convention with details relative to hump operation, which have been so fully covered by various circulars and booklets, issued by the signal companies and by the many papers on the subject, which have been printed from time to time in the *Railway Age*. This committee will dispose of the question of car retarder operation in large yards by stating that all studies have shown them to be an outstanding development of modern transportation.

The committee has been unable to find any installations of retarders in small yards, where an average of 400 to 700 cars per day are handled. At Milwaukee, Wis., in a district yard where approximately 600 cars per day are handled over a lead, and where there is a small grade off a drawbridge, it was decided after an inspection that a small hump operation, with retarders, would be feasible, but as there had been no such installation, good data are not obtainable at this time as to the cost of installation.

This committee succeeded in interesting a signal manufacturer in this matter, and its representatives are working on a study of the yard. They have been furnished with all prints, grade information, etc., in addition to making a ground study with the chairman. It is the sense of the committee that such an installation will greatly reduce the cost of yard operation, providing the installation cost can be reduced. It will increase yard capacity through the faster switching of cars, decrease damage to lading, and reduce personal injuries and damage to equipment.

Discussion

Charles Burlingame (T. R. R. of St. Louis) reported that in a terminal where many classifications must be made and where quick deliveries are essential, there is no economy in hump yard or car retarder operation and that as a result humps have been taken out of some terminals. G. J. Shreeve (Belt Ry. of Chicago) replied that for the vast majority of his traffic, hump yard classification was essential but that he does some classification work by flat switching where the time is not sufficient to permit him to send the cars over the hump. He urged the roads to proceed very carefully before changing from flat to hump switching because of the growing necessity for quick delivery.

Interchange Inspection

In a paper on the possibilities for the reduction of inspection of cars in interchange, G. J. Shreeve, general superintendent, Belt Railway of Chicago, described the experience and resultant benefits derived by the elimination of interchange car inspection in the Clearing yard of the Belt Railway of Chicago. His paper is abstracted below:

Cars passing through the Chicago gateway are inspected from five to six times before departure from the Chicago terminal, which is not only expensive from an inspection standpoint, but is very often the cause of such delays that loaded cars miss regular connections and arrive from 12 to 24 hours late at their destinations.

The interchange rules of today assume the aspect of a necessary evil. The time is coming when, except for the private car, we will have no interchange inspection. We almost inspect a car to death and a good part of its life is spent standing still protected by a blue flag In Chicago, where an average of 20,000 cars are inspected an average of three times, it requires three min. to inspect a car. If these cars are operated in trains of 50 cars, each train stands still 7 hr. and 30 min. for three inspections, or, for 20,000 cars, trains stand still 3,000 hr. per day for interchange inspection.

In order to expedite the movement of cars through Clearing yard, interchange inspection was eliminated. This not only helped to speed up the operation, but in addition reduced the expense for inspection approximately $30,000 per year. To make a proper interchange inspection in accordance with the American Railway Association rules of interchange requires at least three minutes per car. Therefore, we came to the conclusion that inasmuch as the public demands speed and we could not provide service with inbound trains waiting two and three hours for inspection, we could handle our business more rapidly and satisfactorily if the interchange part of the inspection was eliminated, and only a safety inspection was required. The change has been entirely satisfactory.

In July, 1915, shortly after the opening of Clearing yard, 40 car inspectors were employed, and the number was increased to 58 in 1916. At the present time, since the abolishment of interchange inspection, the number of inspectors has been decreased to 30, a reduction of 42 per cent, with a saving of approximately $60,000 per year, and with much less delay in the handling of trains. There have also been fewer accidents caused by defects that were more readily overlooked when the inspector's time was mostly consumed in recording delivering line defects, a practice that was considered necessary at that time for the protection of our company.

It is very doubtful if the benefits derived from interchange inspection will justify the expense incurred. Wood sill-constructed cars are practically a thing of the past. They have been replaced with the steel underframe, and the all-steel car, the majority of which are equipped with A. R. A. standard parts, which make them strong and safe for handling in yard switching, and fast trunk line movement. They do not, therefore, require the technical interchange inspection that was formerly necessary.

The most important parts of cars to be inspected for safe running are the safety appliances, brakes, arch bars, wheels, couplers, and attachments which constitute the "car owner's responsibility," and do not require interchange inspection. The continually increasing demand for faster and more reliable freight service makes it difficult to overestimate the benefit, from an operating standpoint, that would result if freight cars were maintained in condition to make long runs with the same reliability and minimum amount of inspection that is required for passenger cars.

When a car moves to a repair track we do not do all that we could do to correct the defects, in addition to those for which the car was shopped. A policy of calling in equipment for periodical reconditioning will help place cars in good shape and will lessen the need for the mass of detail attending interchange inspection.

After presenting his paper, Mr. Shreeve stated that roads serving two important industrial districts in Chi-

cago have, after a three-months' trial, put into effect a plan similar to that at Clearing yard and expect to save $39,000 annually. Mr. Shreeve added that at Clearing it is no longer the practice to take seal records. Instead, all seals are examined to ascertain their condition but record is made only of any found defective and of others applied, all others being understood to be in good condition. By this means, considerable expense has been eliminated with no adverse results.

Solicitation of Business

The solicitation of business by operating employees or others than members of the traffic department was looked upon with favor by the committee of which F. E. Summers, division superintendent, A. T. & S. F., Emporia, Kan., was chairman. There are great possibilities in such solicitation, the committee's report stated, and continued in part:

Some roads use the "Prospective Business Card" system through which employees provide "tips" concerning possible freight business. These are forwarded to the agent, who follows the prospective traffic until it is actually shipped. Local freight crews and road switching crews have been able to increase freight revenue over their line by showing courtesies to many small business concerns, as well as the larger ones. Some roads have "Booster Clubs" which advise the traffic department of any prospective business. On the whole, employee organizations have undoubtedly been more beneficial than detrimental; they have served to increase the interest of the general public in the necessity for supporting the rail carriers against the unequal competition of newer forms of transportation, and, in time, this may be of real benefit to the railroads.

There is a well defined feeling in some circles that the traffic department should be a part of the operating department. It is a well known fact that all the traffic department has to sell is transportation service, and that service must be furnished by the operating department. Therefore, it can be argued very forcibly that the department which is manufacturing a product should be in a better position to sell its own product than some other department. It is unquestionably necessary that the traffic department know what service it has to sell, and its representatives should be in a position to determine the cost of the service so that they may not be disposed to sell it at a price less than the cost of production.

Courtesy, of a genuine nature, to the shipping and traveling public, is the most important method of indirect solicitation of business. It is something that can be practiced by every railway employee, regardless of position, who comes in contact with the public in any manner. It should not be hard or difficult, particularly for operating department employees, to be pleasant and agreeable in their dealings with the public. An unpleasant attitude by railway employees, in actions or conversation, a sharp answer, an improper tone over the telephone, an indisposition to secure or furnish information requested, a failure to say "Thank you" in completing transactions, does not invite traffic but tends to drive it away.

Discussion

In opening the discussion of this report, W. H. Blake, (S. A. L.) cited the results secured by the agent at a small station on his division where the business had fallen off to the point where the reduction of force, if not the closing of the station, was threatened. Taking this fact, data regarding the amount of taxes paid locally by his railroad, the local payroll and other pertinent data to a meeting of merchants, he has so impressed them with the importance of the railroad to their community that the revenues have since been increased more than $1000 per month. Mr. Blake stated further that since the convention opened he had received a telegram from this agent advising that on that morning three cars of merchandise totaling more than 50,000 lb. had been received at this station.

G. J. Shreeve (Belt Ry. of Chicago) called attention to the fact that the railways are going through a period of readjustment in service in which freight trains are being speeded up to the limit of safety. The place to tighten up, he said, is in the terminals. Interchange must be speeded up universally, much as now prevails with perishable traffic.

A. G. Peck (M.-K.-T.) described a schedule recently called to his attention as having been inaugurated by railroads operating between Boston and Philadelphia to meet truck competition whereby overnight service is given these points, with the result that a very considerable tonnage has been recovered.

Analyzing Freight Train Operation

By B. H. Mann*

Through long years the urge to overbuild the railroads, particularly by double-tracking, has been strong, with the result that we now have lines that were double tracked long ago that ought never to have been so improved. It takes times like these to drive home the fact that the load of fixed charges and upkeep costs of such facilities has cost many a division officer his job. The scientific study of train sheets before any steps are taken to spend money will stop much overbuilding because it will show just what facilities are needed and what are not, where two tracks are needed and where an extra track will not pay. It fits the tracks to the traffic step by step.

The time has come, in the face of motor truck competition, for a station to station search for ways to help train movement by eliminating losses through train delays. It would seem clear that the officers in direct charge of the division should be the men to make this search. The superintendent is on the ground and is in more intimate touch with existing facilities so that he ought to know better what can be done.

A Specific Problem

The Second district of the Wabash, about 100 miles long, needed making over and a ton-mile production study was made of it by request. The work that has been done on the district since the research was made follows the recommendations and the results are working out just as expected.

The problem was to find out how many ton-miles could be produced on this district, what its faults were, how these faults could be corrected, what it would cost and what the return would be on the dollar. In such a case it is necessary to keep in mind not only the local district, but the entire line and perhaps adjacent roads.

The average through freight train movement for the test period was summarized as follows:

	Westward		Eastward	
	Ordinary	Fast	Ordinary	Fast
Total running time plus delays (minutes)	481.5	335.6	432.5	294.4
Total running time plus delays (hours and minutes)	8-01.5	5-35.6	7-12.5	4-54.4
Critical time (12.5 m.p.h.) (hours and minutes)	8-06.2	....	....	....
Average number of trains	192	51	136	101
Percentage of trip time spent on sidings	39.6	31.1	28.9	14.7
Percentage of trip on sidings (excluding initial and final terminal delays)	26.5	14.6	18.1	7.0
Rate of speed between terminals (m.p.h.)	12.6	18.1	14.1	20.6
Average distance apart of OS telegraph stations	7.2	....	....	....
Average speed (m.p.h.) between OS stations (in motion)	20.9	26.3	18.8	24.2

In the above figures the eastward fast freight movement is so far above the others as to be of little aid in picking the faults of the territory for correction. There is also a sharp difference between the movement of the four classes of traffic, a fact which must be kept in mind in planning sidings.

Ton-Mile Production Losses

Ton-Mile production losses come from:

(1) Sidings that do not fit the meeting and passing points. Two long-enough parallel tracks are needed at points where there are to be two trains abreast and no where else.

(2) Stopping a train to take or leave a siding.

(3) Locomotive tenders too small to permit a train to make the most ton-miles.

(4) Too much time taken to confer superiority.

(5) Absence of time-saving means of communication between conductor, engineman and dispatcher.

(6) Locomotives in service to "run out mileage" between

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classified repairs instead of correcting individual defects at each wash-out period.

Until the idea of making freight train economy studies was inaugurated, a full district mass of train sheets had never been the last word as to where a siding should be located. Other considerations, such as first cost, convenience in building, and existing sidings have predominated. This brought about a situation of the "tail wagging the dog" as the traffic was forced through the roadway, be the latter as it may, instead of fitting the roadway to the traffic needs.

The superintendent wants two tracks side by side only where there are apt to be two moving trains side by side. What he wants to know is, what can be done, what it will cost, and what it will return on the money. A cheap new siding may be a mere "shot in the dark."

Until quite recently, the ton-mile losses due to stopping and starting trains were taken as a matter of course and as not amounting to much. When a superintendent acquires the point of view of factory production of ton-miles and the cost of making each ton-mile at every point, his viewpoint changes. No loss will then be taken as a matter of course. Whether the stopping of such a loss is worth more than the cost of a remote control or spring switch is a matter local to each individual switch. There can be no fixed rule. One general finding is that it does not always pay to relieve a train crew from handling every switch on a run.

Crews of inferior trains are sometimes asked to take the risk of blame where a bad name goes with the stopping of superior trains at meeting or passing points. On the other hand, a train crew may be called slow when it refuses to make "close" runs. This all goes with train operation by time table and train order. The extent to which contingencies can be protected against that come up in the daily running of freight trains is usually inversely as the number of open telegraph offices that can be afforded. As against this, when a railroad confers the superiority through its authorized agent, the dispatcher, by signals, the crew's business is to make the run. Fear in making meets is replaced by confidence. There is a fixing of responsibility upon one who knows best all the surrroundings of the "meet" or "pass." Again, not until a train whistles off brakes to leave a terminal or when it is closely approaching the inferior switch at an intermediate station, is the "yes" or "no" to go necessary. The time required to set up or change a movement is as nothing. The cumulative losses of an extra stop may be avoided.

A master mechanic may have in mind that it devolves on him alone to settle matters having to do with savings in locomotive repairs—an item comprising, roughly, one-third of the direct freight train expense. The chief dispatcher often has in hand for the superintendent the entire direct freight train expense. The arbitrary running out of fixed mileage with power gone "lame" between times of classified repairs may therefore "rob Peter to pay Paul" where Peter loses three to one that Paul gains. The positive inspection and repair at wash-out periods has effected a big saving, both in cost of repairs, and in dependable movement in the meanwhile.

Typical Day's Work of Wabash Second District

The graphical train sheet of the second district of the Wabash for a typical 24-hr. day brings out sharply that there was no one "cure-all" for its faults. Having in mind the largest return on the dollar invested, more siding space, widely scattered, was seen to be the first need. The loss through lack of a quick way to confer superiority was not outstanding over the entire sub-division. The demand for relief of the train crews from handling the switches was felt in spots.

There was a uniform call for handling the switches at certain time intervals for a part of the train trip, and a call for such help, here and there, for the remainder. Between State Line and Peru, sidings were made longer where the study showed the need. Between State Line and Lafayette, about half the way, there were calls for the meeting and passing of trains, spaced rather evenly throughout the 24-hr. day and throughout the territory named. The savings were sufficient to warrant the immediate installation of signal control of the trains here and it was done. With it went the remote control of switches at selected points. Between Lafayette and Peru, the other half of the way, local conditions showed by the study that while sidings should be made longer, signal control could be postponed. Certain isolated remote control switches were needed and were built.

In the entire subdivision layout, each item of any kind was studied and as there was a limited fixed sum of money allotted to cover all of the improvements it was a problem of the "survival of the fittest." Of course there were some surprises in the recommendations, for the saying is that "Sometimes one may live too close for a clear view."

Rate Hearings Begin July 15

WASHINGTON, D. C.

THE Interstate Commerce Commission apparently does not intend to be rushed by the railroad financial emergency into allowing the 15 per cent rate advance case to interfere with vacations in August. On June 30 it announced that the initial hearing on the application of the railroads, which it has docketed as Ex Parte 103, will be held at Washington on July 15. At this hearing the petitioners and parties supporting the petition will be heard. Other hearings, beginning August, 31, will be held for the further cross-examination of the witnesses presented at the initial hearing and for the submission of evidence by protestants. Also hearings will probably be held at points other than Washington, the commission announced, but the number of such places will be limited. All who desire to offer evidence in opposition are to notify the commission on or before July 20, indicating the general character of the evidence and the approximate amount of time required and, following the receipt of these requests, a schedule will be prepared and announced covering dates, places and the order of testimony.

This announcement was made five days after the receipt of the reply from the railway executives informing the commission that they desired authority for a flat 15 per cent advance, except for differentials, and without waiting for the expiration of the 15 days which the commission had allowed from June 19 for the reply to its questions as to what, if any, exceptions were proposed. The commission also stated its desire that evidence be presented as concisely as possible, using exhibits to curtail oral testimony, and said that as far as practicable exhibits should be made available to all parties of record in advance of the time at which they are to be offered in evidence.

Ordinarily the commission does not have hearings or oral arguments in August and ordinarily most of the commissioners take their vacations at that time. The work of the organization goes on, although slowed up to some extent by the vacations of members of the commission's large staff and office force. Unless the testimony presented by those favoring the rate advance should be protracted the program announced by the commission would almost enable the normal August routine to be followed, except for those members of the commission's organization whose duty it will be to analyze and check up on the statistical testimony of the proponents. Perhaps, also, the adjournment to the end of August will make it possible for the evidence of the protestants, but more particularly their cross-examination of the railroad witnesses, to be handled with less heat and more speed. Some of the long hearings held during the summer in the war period were rather wearisome.

In some quarters some significance was seen in the fact that at the same time it announced the rate advance hearings the commission issued formal orders directing the railroads to put into effect on December 3 the rates prescribed in its orders in the western trunk line and eastern class rate revision cases, which have been postponed from time to time during the past year because of the large amount of work involved in the preparation of tariffs. It is understood there has been some feeling of criticism of the railroads in the organization of the commission because they have delayed taking advantage of the rate increases included in these revisions, as to which the commission is much more optimistic than the railroads. In

the western class rate case the commission estimated that the roads might derive an increase of $10,000,000 to $12,000,000 in revenues, if the state commissions followed suit and authorized similar rates, while the railroads have insisted there were comparatively few possibilities of revenue increase in the rates prescribed. In the eastern case, also, the commission has insisted that there are revenue possibilities, of $20,000,000 to $25,000,000 while the railroads contended that the net effect was more likely to be a loss of some $25,000,000, and that the rates increased were more particularly short haul rates where the competition of the trucks is felt most keenly while reductions were made in rates on traffic less susceptible to competition. The commission had recently issued a notice that it expected the class rates to be made effective on December 3, but now it has ordered them in, and there has been some speculation to the effect that it may want them to point to as an example of something it had tried to do to improve railroad revenues. The estimates of increased earnings were based largely on traffic conditions at the time of the hearings in these cases.

The western trunk line class rates represent what is left as the outcome of the efforts of the western roads to get a 5 per cent emergency increase in rates which they began in 1925. In 1926 the commission found that no financial emergency existed as to the whole of the western district and denied that application. The railroads then sought an upward revision of the class rate structure in western trunk line territory and the commission announced its decision, allowing some increases, last July, although much less than the roads had asked. The delay in putting the rates into effect has been caused by the tremendous volume of tariff work required and also to the general desire to have the readjustments in the East and the West become effective concurrently, because of the interterritorial rates involved, while the lake lines had urged that the rates be not established during the latter end of the navigation season. Some modifications of the original findings have been made. The eastern roads had petitioned the commission for a modification of the findings so as to increase the rates prescribed for fifth and sixth class but this was denied by the commission earlier in the year. The eastern case has been before the commission since 1924.

Only Three Formal Protests Received

Only three formal protests against the proposed rate increase have been received by the commission to date. The first was on behalf of the North Carolina Traffic League, the Southern Furniture Manufacturers' Association, the Mathieson Alkali Works, the Charlotte (N. C.) Shippers and Manufacturers' Association, and the Blue Ridge Glass Association, and it was followed by protests from the Growers' and Shippers' League of Florida and the United Paperboard Company, of New York. The "floods" of protests referred to in many newspaper reports are the informal letters and telegrams, mainly from individuals and many of them addressed to President Hoover, mostly on the basis of newspaper reports that the railroads were preparing to "demand" a rate increase, but including a few from associations of shippers or large companies, which the commission has placed in its correspondence file and which the commissioners have had little or no opportunity to read because they have been kept busy all day in the press room. There have been nearly two hundred of these informal communications and the number has dropped off in the last few days, although they will probably be succeeded by the formal protests sent by those familiar with the commission's practice, who expect to take part in the case and will furnish the number of copies the commission requires so that each commissioner may have one to read if he wants to.

The Secretary of Agriculture, Arthur M. Hyde, in an address at Indianapolis on June 25, expressed the hope that "in the consideration of the appeal of the railroads for higher freight rates, the Interstate Commerce Commission will take into consideration the fact that while therevenues of the railroads dropped 16 per cent last year, the revenues of the farmers dropped 20 per cent; that farm prices are down to pre-war levels while freight rates are relatively high; that with many products taxes, manufacturing costs and railroad rates can be passed on to the consumer, but that the farmer cannot pass his costs on." "I have no right to speak for the Interstate Commerce Commission," he said, "and I do not intend to do so, but I have a feeling—based on its order of reduction of agricultural and horticultural rates a few months ago, which order the railroads held up by injunction—that the commission understands and sympathizes with the needs and the plight of American agriculture".

The directors of the American Cotton Cooperative Association on June 26 adopted a resolution protesting against any increase in railroad rates on cotton.

If the Interstate Commerce Commission had expected to widen into an open breach the differences of opinion among some of the railroad officers as to whether certain classes of traffic should be excepted from the general proposal to increase rates 15 per cent by its order directing them to specify what, if any, exceptions they intended to make, it was disappointed by the reply it received on June 25 from the railway executives in which they unanimously "stood pat" on the application filed June 17 and stated that they were prepared, if authorized, to apply the 15 per cent increase to all rates, excepting only such adjustments in the case of coal, coke and certain other commodities as may be necessary to preserve existing differentials in cents per hundred pounds.

The only information in the reply that was not in the original application was that it was intended to include international rates, to and from Canada and Mexico, that it was filed with the concurrence of the water lines participating in rail-and-water rates, and that, as implied in the application, necessary changes and readjustments, and in some instances reductions to meet competition and other situations, would be made as promptly as possible after the proposed increased rates become effective.

A division of the commission composed of Commissioners Meyer, Lewis and Lee has been created to take administrative charge of the proceeding. Other members of the commission will sit in the hearings as much as their other duties permit. Examiners William A. Disque, G. H. Mattingly and Howard Hosmer have been assigned to the case to aid the commissioners.

Petitions for increases in intrastate rates have also been filed by the carriers and meetings of representatives of state commissions have been called for July 7 by President Harvey H. Hannah of the National Association of Railroad and Utilities Commissioners. The eastern group will meet in Washington, the southern group in Atlanta, the western group in Kansas City, and the Mountain-Pacific group at Salt Lake City, to select district representatives of the states to sit with the Interstate Commerce Commission as a co-operating committee. The arrangements are similar to those in 1920 when the Interstate Commerce Commission and a committee representing the states sat in Ex Parte 74.

Admixture Aids in Long Haul of Concrete

THE admixture of diatomaceous silica in the concrete for structures built on the Connellsville extension of the Pittsburgh & West Virginia, was the means of solving a difficult construction problem. Owing to the physical obstacles imposed by the territory which this line occupies, as described in an article in the *Railway Age* of August 16, 1930, page 320, the building of the various piers, abutments, arches and culverts entailed many difficulties. The country is exceedingly rough and the structures occupy isolated locations to which concrete materials and machinery for mixing plants could not readily be delivered. Because of this condition and the obvious advantage of central mixing plants, the contractor, the Vang Construction Company of Pittsburgh, Pa., arranged to mix the concrete at five central plants, and, with a few minor exceptions, all of the concrete placed on this job was centrally mixed.

Attempts were first made to transport the concrete without any workability agent, over long hauls in seven

Concrete Had to Be Delivered to the Many Substructure Units of Viaducts Like This

and eight-ton agitating trucks. After operating these trucks for two days over the steep hills and rough roads, it was realized that lighter trucks were needed to speed up delivery. Consequently, 2½ and 3-ton pneumatic-tired, open-body dump trucks with a capacity of 2 cu. yd. were put in service. These open-body trucks were not equipped to agitate the concrete after receiving it from the mixer, except to the extent that it was naturally agitated in the truck bodies bumping over the rough roads. When these trucks were unloaded at the job, it was practically necessary to remix the concrete by hand in order to place it satisfactorily. The lack of workability was due to the segregation which took place during the long haul. In order to avoid this segregation the bottoms of the trucks were lined with curved steel sheets, which eliminated the sharp corners in the truck bodies, and imparted a rolling effect to the mix during transit. This change reduced the segregation but the concrete still did not have adequate workability for proper placement when it arrived at the point of deposit.

Following this experience efforts were made to solve the problem both by adding more cement and by introducing an admixture, but the use of additional cement resulted in an excessive increase in the cost, and the results obtained with the admixture tested were not deemed adequately effective. Diatomaceous silica, marketed by Johns-Manville under the name Celite, was then tried, using it in the proportion of three per cent of Celite by weight of the cement. Celite is light; consequently the proportion by volume is considerably larger.

Concrete containing Celite was hauled over extremely rough and hilly roads for an average distance of seven miles and a maximum of 13 miles that required 1-¼ hr. elapsed time. The results were said to be entirely satisfactory. Segregation was eliminated and the workability was so much improved as greatly to reduce the labor of placing the concrete in the forms. Some of the concrete was chuted a distance of 450 ft. after delivery.

After this admixture had been used for some time a series of tests were conducted over a period of 10 days to determine whether any other admixture would produce the desired workability at a lower cost. Four different materials, designated in the table as A, B, C and D, were added to the concrete at the central mixing plant. The first tests were made by adding the materials in accordance with the manufacturer's specifications. An inspector was stationed in the field to observe the effect of the different materials on the workability of the concrete when the trucks were dumped after

Effect of Hauling Mixed Concrete on its Workability

Admixture	Manufacturer's Recommended Quantity	Workability at 6 Miles Compared with Workability at Mixer	Workability at 12 Miles Compared with Workability at Mixer
Celite	3%	95%	85%
B	5%	80%	60%
A	5%	60%	30%
C	7.5%	40%	10%
No admixture	...	30%	10%
D	10%	30%	Practically zero

hauls of 6 and 12 miles. The tests proved that Celite was superior to the other admixtures.

Another test was run in which three per cent of each admixture per bag of cement was added to the concrete. This meant cutting down the proportion of some of the admixtures below the manufacturer's specifications. In this test the same material gave the best results. The other materials gave equivalent results when the percentage of admixture were increased, but the amounts required were said to be such as greatly to increase the cost, and the use of Celite was accordingly adopted and applied to 85,000 cu. yd. of concrete out of a total of 125,000 cu. yd. required for the entire project.

The three classes of concrete used on this job, containing three per cent Celite, were proportioned in accordance with the following schedule:

Class A—3000-lb.—1 :2.1 :3.3—6.00 gal. water per sack of cement
Class B—2500-lb.—1 :2.2 :4.1—6.75 gal. water per sack of cement
Class C—2000-lb.—1 :2.8 :4.7—7.50 gal. water per sack of cement

A test specimen for each 200 cu. yd. of concrete poured was sent to a laboratory, and compression tests showed that 80 per cent of these specimens exceeded the design strength by 20 per cent or more.

THE ASSOCIATION OF CRAFT EMPLOYEES of the Central region of the Pennsylvania celebrated its tenth anniversary in connection with its sixth biennial convention held in the Hotel Buffalo, Buffalo, N. Y., June 16 to 18. Delegates to the convention represented ten operating divisions of the Central region and form an integral part of the Pennsylvania's general plan of employee representation.

Special Agents Study Increased Robbery Losses

FIGURES of robbery losses on the railways of the United States in 1930, which show that in that year claims attributed to that cause amounted to $990,255, as compared to $757,803 in 1929, and $928,-563 in 1928, were presented to the Protective Section of the American Railway Association at its annual meeting at Chicago on June 23-25 by A. L. Green, special representative, Committee on Freight Claim Prevention, A. R. A. The amount of claims paid per million ton-miles was $2.56 in 1930, $1.69 in 1929 and $2.14 in 1928. At the closing session at the Stevens Hotel the section elected D. L. Webb, chief special agent, Minneapolis, St. Paul & Sault Ste. Marie, as its chairman. G. W. Buzby, superintendent of police, Pennsylvania, and E. de B. Panet, chief, department of investigation, Canadian Pacific, were elected first and second vice-chairman respectively.

Police Activities from the Claim Standpoint

In explanation of the figures concerning claim payments attributable to robbery losses, Mr. Green said:

"On the claim record alone the 1930 robbery experience was not a good one, but to gage the quality of protection furnished by the percentage of increase is deceptive. A 30 per cent increase in freight robberies truly is a danger sign for the future but not necessarily a blot on the past.

There were conditions in 1930 that put the protection departments to an extraordinary test. It is a matter of very definite knowledge with police executives that unemployment running into the millions does materially increase crime in general and it does increase the number of thieves preying upon railroad property and especially upon freight in transit. Despite this unusually difficult situation, which in ordinary times would have called for increased protection, most chiefs had to make heavy cuts in forces, and hence each man, and especially the commanding officers, had a much harder job. Moreover, there were large increases in cigarette production, the theft losses on which equal about one-third of all thefts, and the wholesale price of cigarettes had gone up, making each robbery run higher in the claim account.

Notwithstanding all these adverse conditions, the increase in freight thefts was held down to less than $1 per mile of road operated and the total was less than in any year since 1920 except 1928 and 1929, and actually was less than half the amount paid in 1914 for stolen freight, and if compared on the basis of values and ton-miles, the 1930 payment was only one-third as much as in 1914. In 1921, with millions out of employment, freight thefts totaled $9,924,747, compared with $990,255 in 1930. Reduced to the common level of prices as of the year 1926, theft claims in 1921 amounted to $32.02 per million ton-miles, against $2.58 for 1930. In other words, freight robberies in 1930 were relatively 12 times less than in 1921.

Taking into account all freight shortages, including known thefts, which we term the theft element, we find that since the organization of the Protective Section 10 years ago, such losses have been reduced 91 per cent. In 1920, freight shortages cost the railways an estimated $44,000,000; in 1930 the figure was $3,941,089. The Railway Express Agency has done equally well; shortages of express shipments having come down from $14,775,223 in 1920 to $981,914 in 1930, a decrease of 93.4 per cent. And from Chief Special Agent E. J. Brennan comes assurance that Pullman transportation has become the safest in the world; that in the last five or six years there have been only six hold-ups in Pullman cars and the railway special agents got every one of the guilty parties. It thus appears that freight and express shortages valued at approximately 60 million dollars for 1920 have been gradually reduced to $4,923,000 in 1930, which means that freight and express services have been made that much more dependable and a tremendous economic waste and burden on rates have been removed.

A lesson from recent experience is the value of train riders. The police chief of a large line says: "I personally feel that train riders are an indispensable part of the railroad police organization. We are continually using their services and certain of our merchandise trains are ridden daily by these men through certain areas. I attribute to a large degree my reduction in robbery of freight in transit to the effective work of train riders. I cannot see how anyone can effectively police trains through certain localities without the utilization of this type of officer."

No review of railway police and claim prevention activities is complete without a reference to the constant necessity for quick and complete reporting of valuable shortages and apparent robberies of interline shipments. The ordinary machinery set up for the reporting of entire package shortages, where robbery is not evident, is altogether too slow to serve police requirements, the essence of which is promptness. It is true that analyses of short reports have been made to prove that a large percentage of shortages "take care of themselves" in due course, that is, the freight subsequently arrives astray, or the record was in error, and while it is not suggested that all short reports be sent to the police departments on the heavy merchandise carriers, it is urged that a thorough investigation will show how the present condition can be materially improved.

Robbery Losses in 1931 Increase

Figures presented by H. L. Denton, general superintendent of police, Baltimore & Ohio, showed that robbery claims paid by the railroads during the first four months of 1931 amounted to $414,725, as compared with $317,324 in the corresponding period of 1930, an increase of 30.7 per cent. Of this total, claims for robbery of the entire package amounted to $284,074 in the first four months of 1931 and $203,-886 in the same period of 1930, or an increase of 40 per cent.

R. H. Aishton, president of the American Railway Association, spoke to the convention on June 23, and after congratulating the railway police forces on their past showing in suppressing theft, urged them to maintain their efforts in that direction. The railway police officer has an important part to play in relations with the public in addition to protecting his railway's property, he said.

J. D. Shields, freight claim agent, Chicago, Burlington & Quincy, stated that "the two freight loss accounts of robbery of the entire package and robbery of other than the entire package showed an increase of $232,452 in 1930 over 1929, which can be attributed to the unemployment situation and to the fact that many of the roads have decreased their police forces. If there ever was a time when police forces should be maintained at normal, it is the present."

He urged the police officers to concentrate on the protection of tobacco and tobacco products, losses on which increased $116,797 in 1930, and on dry goods, clothing and textiles, which increased $65,007. He also urged them to spend time in the freight claim offices of their respective roads to study the question of the carriers' liability in the adjustment of claims for the loss and damage of freight. On the Burlington the special agents' reports advise as to the overloading of livestock, loading in dirty cars, failure to drench hogs in warm weather, loading crippled or dead animals and failure to partition crippled animals. These livestock handling reports have been found to be very valuable, Mr. Shields said.

A brief characterization of a successful railroad police organization was given by Bruce Stout, chief of police, Central of New Jersey. The organization does not judge an officer today by the number of arrests he makes but by his general accomplishments and achievements, he said.

"Arrests mean robberies", Mr. Stout continued, "and the policy is to prevent them through efficient protection service, thereby eliminating the opportunity for crimes and offenses and the development or existence of undesirable conditions which may result in loss or

damage. Our efficiency depends on a decline in losses and if the railroads did not lose a dollar because of robbery and we did not make a single arrest our score with respect to that character of crime would be perfect. Prevention is the goal and full co-operation is being extended in an effort to reach it."

C. L. Jellinghaus, superintendent of property protection of the New York Central, in an address entitled "Science in Police Work" recounted the ways in which the development of new ideas in police work are based upon scientific principles. He said in part:

Knowledge gained during the past 10 years, and verified by observation and facts recorded in our localization records of losses, has proved to us without question the value of a uniformed officer on fixed post duty. He has advertised the fact that a certain territory is under constant police protection and kept the thief away or afraid to act. He has increased confidence in himself. The psychological effect of both has tended to reduce losses.

Again, railroad police forces have improved materially the type and character of the men hired for police duty through careful investigation and, incidentally, fingerprinting. A police officer who "goes wrong" is a rarity. Definite rules for supervisory officers on a large system to guide them in the selection of intelligent, qualified and honest men, have been helpful. I believe that a code of recommended practices would be valuable if issued by the Protective Section.

[The section adopted a resolution directing the preparation of such a code of rules for submission to the 1932 meeting. EDITOR.]

If an officer on regular post duty in a yard makes an inspection of seals either on the arrival or departure, or both, of the main symbol trains passing through his yard, it aids immeasurably in the localization of losses. If we permitted our trains to pass from New York to Chicago without inspection, you can appreciate how hopeless it would be to develop where a loss had occurred unless the car door is left open or the train crews have a record. The psychological effect of such inspections upon yard employees is also important. If they know that a loss is quickly localized, they are on their guard.

A new problem has arisen which will require your best ingenuity and scientific thinking. It is granted that the advent of prohibition saw the end of the carriers' constantly mounting robbery total, and that it has had an important bearing on the decrease in robberies during the past 10 years. Last year however, there was a very material increase, 45 per cent to be exact, in tobacco and cigarette losses, much greater than the increase in dry goods and clothing. It would not surprise me to see tobacco and cigarettes take first place in the robbery column this year, displacing dry goods and clothing, first in previous years as far back as records go. It is apparent that some of our recent and heavy cigarette losses are related to the bootleg element. There is no single commodity moving in volume which is as easily disposed of, especially in speakeasies, as cigarettes. The situation is one for sober thought, as it is a forerunner of what we can expect were prohibition to come to an end.

D. G. Phillips, superintendent of safety, Wabash, speaking on the subject of "The Railroad Policeman and Safety Work", emphasized the necessity of breaking up habits that are unsafe. He called this to the attention of the Protective Section because the special agents have a better chance to observe unsafe practices than any other group of railroad men. One of the worst habits is that of stepping on a track without looking in both directions and Mr. Phillips declared that the railway police can be of great assistance in discouraging that practice.

Militarization of Railway Police

The question of whether railway police should be militarized was discussed by Maj. F. A. Thiessen, chief of police, Delaware & Hudson. Without having reference to the former Russian method of military instruction, which is extremely harsh and produces a machine-like man, Major Thiessen described the application of United States Army organization, administration, training and discipline to a railway police force. No matter what the size of the department it can be organized as some unit of the army, a squad for a force of six or seven men, a company for 40 to 100 men, a battalion for 100 to 400 men and a regiment for 400 to 1,000 men, he said.

Major Thiessen favored the uniforming of railway policemen as a means of promoting their pride in the job of protecting company property. He emphasized the necessity for thorough training of the recruit before he is given full authority as a policeman. Military methods or principles can be carried too far, said Major Thiessen, but any principle or method which will help build up an esprit de corps in railroad police department is well worth trying. He concluded with the thought that there can be no doubt but that the general public receives a better impression and has more respect for a uniformed man who is spic and span than for one who has various fobs and jewelry attached to his person.

D. M. Lay, chief special agent, Kansas City Southern, called attention to the marked improvement in the type of men employed as railroad special agents from the days when the ideal was considered to be a former municipal policeman who was little more than a bully. He advocated careful training of the police officer and suggested that he be urged to visit court rooms to obtain experience as a witness and community functions to gain for himself a creditable position in his community, and that wherever possible he be allowed to attend police schools such as that maintained by the State of New York.

"Accident prevention has always been regarded as an important feature in railroad operation and in the past few years fine results in saving life and property have followed," continued Mr. Lay. "This involves the prevention of fire in company property, including freight in terminals. While the railroads have men who devote their entire time to these matters, it is all a part of operation and one in which the police departments can and should actively interest themselves. This applies not only to the prevention of avoidable personal injury to themselves, but involves being on the lookout for unsafe conditions and practices which might cause injury to passengers, employees, trespassers and travelers at highway crossings. Special officers should have a good working knowledge of every day safety and fire prevention rules. They should also be familiar with the rules of the transportation department.

"Until legislation has been enacted providing for the commissioning of the railway special officer by the federal government, no discussion of him is complete without the plea that the chief protective officers of every road should continue their joint efforts to bring this about. The necessity for this step becomes greater every day when we consider the growth of crime in our country and the use made of freight and passenger trains as a means of eluding capture. A trained police officer free from political influence and unfraid of local sentiment would be in a fine position to render more and better service both to his company and to our country."

G. W. Buzby, superintendent of police, Pennsylvania, discussed a new problem that has arisen recently, that of the counterfeiting of tickets, and the ways and means of attacking it. Representatives of other eastern roads also called attention to the problem of ticket scalping which has grown in seriousness with the widespread sale of low rate round trip excursion tickets which require no validation.

Freight Car Loading Is Lowest on Record

WASHINGTON, D. C.

REVENUE freight car loading in the first three weeks of June has been lower than in the corresponding period of any year since the compilation of car loading statistics for the roads as a whole was begun in 1918. For the year to date the total loading has been less than for the corresponding period of any year since 1921 but in June the figures fell below the level set during that year of depression. For the week ended June 20 the total was 739,116 cars, which was 6,663 cars more than the total for the week before but a reduction of 181,529 cars as compared with the corresponding week of last year and of 330,758 cars as compared with 1929. For the first three weeks of June this year the totals have been 760,890, 732,453 and 739,116, as compared with 787,283, 775,328, and 775,447 in the corresponding weeks of 1921.

The figures for the week of June 20 were somewhat lower than had been expected because of the delay in the heavy movement of wheat expected in the Southwest. Grain and grain products showed a reduction of 6,934 cars as compared with last year. Ore loading also showed a decrease of 32,553 cars, while miscellaneous loading showed a reduction of 70,582 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, June 20, 1931

Districts	1931	1930	1929
Eastern	166,914	205,236	245,583
Allegheny	141,798	189,189	223,801
Pocahontas	46,940	51,777	58,611
Southern	109,252	123,497	143,029
Northwestern	104,845	149,052	173,006
Central Western	107,431	129,888	145,858
Southwestern	61,936	72,006	79,986
Total Western Districts	274,212	350,946	398,850
Total All Roads	739,116	920,645	1,069,874
Commodities			
Grain and Grain Products	32,763	39,697	45,327
Live Stock	19,554	21,325	23,353
Coal	109,337	132,497	153,653
Coke	5,451	9,334	12,093
Forest Products	30,614	49,637	70,903
Ore	30,640	63,193	75,432
Merchandise L.C.L.	217,133	240,756	259,376
Miscellaneous	293,624	364,206	429,737
June 20	739,116	920,645	1,069,874
June 13	732,453	926,066	1,069,670
June 6	760,890	935,582	1,055,768
May 30	710,934	860,064	972,825
May 23	755,071	929,606	1,062,088
Cumulative total, 25 weeks	18,220,694	22,263,886	24,520,384

The freight car surplus for the week ended June 15 averaged 626,050 cars, an increase of 12,235 cars as compared with the preceding week. The total included 320,650 box cars, 234,593 coal cars, 31,521 stock cars and 15,585 refrigerator cars.

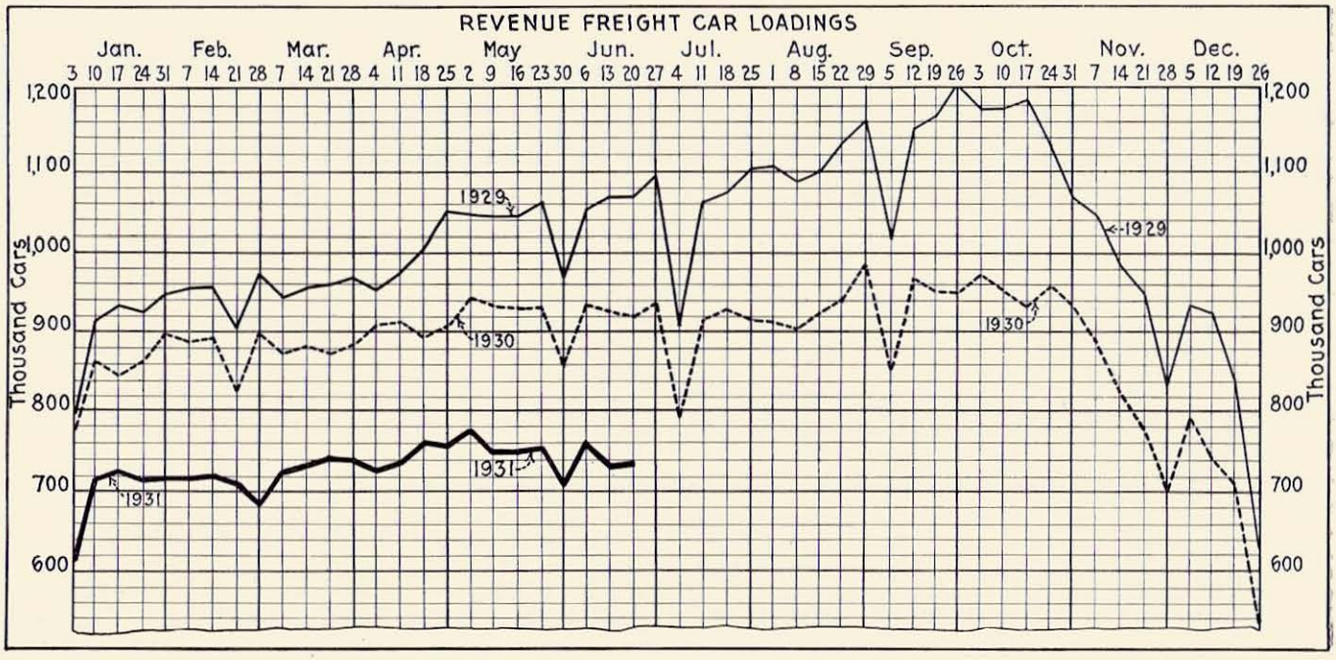
Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended June 20 totaled 51,987 cars, a decrease of 186 cars from the previous week and a decrease of 11,812 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
June 20, 1931	51,987	23,194
June 13, 1931	52,173	23,673
June 6, 1931	49,957	23,751
June 21, 1930	63,799	30,929
Cumulative Totals for Canada		
June 20, 1931	1,207,417	696,153
June 21, 1930	1,467,851	890,936
June 22, 1929	1,632,379	1,067,928

FAST STOCK TRAINS.—The railroads between Omaha, Neb., and Chicago, now run their livestock trains so as to provide fourth morning delivery in New York, instead of fifth morning delivery. The trains leave South Omaha in the evening about three hours earlier than previously and arrive in Chicago the next afternoon instead of the following morning.

AN INCREASE OF 25 PER CENT in passenger fares on French railways, which, since 1922, have been among the lowest in Europe, is being considered as one means of offsetting diminishing revenues, with public objection to such a step being overcome by remission of the 20 per cent tax now levied on tickets, to bring the burden of the increase on the national budget. French car loadings, in the first four months of the current year, dropped about 4.5 per cent, as compared with 1930, while revenues, in the same period, decreased between seven and eight per cent.



New Books . . .

Universal Directory of Railway Officials, 1931. 384 pages, 8¼ in. by 5¼ in. Bound in cloth. Published by the Directory Publishing Company, Ltd., 33 Tothill Street, Westminster, London. Price $5.

This is the thirty-seventh edition of this well-known directory which is published in the usual form to bring up to date its list of railway officers in Great Britain, Ireland, Europe, Asia, Africa, Australasia, and North, Central and South America. The data includes lists of the principal executive, financial, engineering, mechanical, operating and traffic officers of each railroad, together with information on the gage, mileage and equipment of the various lines; there are also included sections devoted to listings of railroad institutions and associations and of manufacturers and retailers of railway equipment, supplies, machinery and tools. The directory is conveniently indexed by countries, by railroads and by individual officers.

The Autobiography of an Engineer, by William LeRoy Emmet. 213 pages, 8¼ in. by 5½ in. Illustrated. Bound in cloth. Published by the Fort Orange Press, Albany, N. Y. Price $2.

This book may be described as a simple and straighforward story, concisely told, of a full and useful life. Mr. Emmet is classed as "one of the famous quartet of General Electric creative engineers, the others being Elihu Thomson, physicist and inventor, Charles P. Steinmetz, mathematician, and Willis R. Whitney, chemist and chief of research laboratory." During his 45 years of activity he has had a leading part in at least four important phases of electrical development. The first embraced contributions to many types of apparatus and methods of distribution which have been extensively used in the central station electric industry; the second covered steam turbine electric apparatus; the third related to the electrical propulsion of ships and the fourth has been the invention, design and development of the mercury vapor power system.

But while the foregoing are covered adequately in the book it could not be called a technical work. For example there is in the opening chapters the account of Mr. Emmet's boyhood. Then comes his discourses on his student days at Annapolis, his experience in the navy and his recalling of trying times throughout the country on work in connection with pioneer electric traction systems. In short, a vivid account of the author's life is skilfully combined with descriptions of his work as engineer and inventor.

Deutsches Verkehrsbuch, by Dr. Hans Baumann. 550 pages, 6¾ in. by 9½ in. Illustrated with Photographs and Maps. Bound in Cloth. Published by the Deutsche Verlagsgesellschaft M.B.H., Berlin, Germany.

This is a handbook of transportation in Germany—and a most complete one it is. The compiler has attempted not only to give the essential information about transport as it is today, but also to include the history of the development of the industry within the compass of one volume. He has succeeded admirably. It would be impossible to give here even an approximation of the many subjects covered—but the following random list will at least show the great range: Brief history of the development of the railways with outstanding events listed chronologically; administrative systems employed; organization of the Reichsbahn under the Dawes Plan with a detailed list of all departments and names and photographs of the officers who head them; financial operations; transport service performed (statistics and illustrations of equipment); train speeds; rates and fares; baggage service; various classes of freight service; railway technique and machinery signaling personnel; sleeping cars; publicity; other forms of transport (interurban lines, buses and trucks, inland waterways); ocean transport; air transport. In short, the book plainly offers a ready answer to almost any general question which one might ask about transportation in Germany. It is a work of reference which will undoubtedly be extensively and profitably used.

Odds and Ends . . .

Rice Confounds a Burglar

When not engaged in nabbing burglars T. J. Rice is Louisville & Nashville agent at Ravenna, Ky. Recently Rice came across a man intent upon entering a grocery store in Ravenna via a side window. As soon as the intruder had gained the inside of the store Rice commanded him to "stick 'em up." Later when the burglar was in the custody of the police Rice revealed that his only weapon was a flashlight.

Oldest Switch Key?

What is probably the record among switch keys is held by one which was turned back to the St. Louis-San Francisco stores department, a month ago, worn out after 47 years of service. The key belonged to W. A. Franks, bridge carpenter at Sherman, Tex., who obtained it from a bridge foreman on the Southwestern division on May 1, 1904. At that time the bridge foreman had been using the key for 20 years. If there are any older ones this department would like to hear of them.

The Last Narrow Gage in Ohio

The last narrow gage railroad in Ohio has discontinued operation. Acting under authority of the Interstate Commerce Commission, the Pennsylvania has abandoned the operation of the Ohio River & Western, a 3-ft. gage steam railroad with one mixed train a day each way between Bellaire, Ohio, and Woodsfield, 42 miles. In its more palmy days the railroad was operated between Bellaire and Zanesville, 112 miles. It is interesting to note that the portion now being abandoned is the same line that was opened by the Bellaire & Southwestern with 35-lb. rail in the heyday of the narrow gage movement in 1879, when there were nearly 1,000 miles of 3-ft. gage in Ohio. In 1909, several years after the reorganization of the road as the Ohio River & Western, a third rail was laid, permitting the operation of standard gage equipment from Bellaire to Vallonia, 9 miles.

Irish Railroaders

I wonder if your experience goes back to the time when practically every railroad man, particularly in track service, was an Irishman. One of the things that we have lost in color and interest in the railroad business has been that end of it with these beautiful builders, their marvelous loyalty, and their marvelous brogue. I remember once when a western railroad general manager became very much interested in getting a load of stones, and in putting them around the signal posts, and having them whitewashed and some other things which were rather advanced in those days. He also required his section foremen to send in a weekly report generalizing the work. He got a report from an Irish foreman who had a Chinese gang, and the foreman said: "Two days landscape gardening, two days painting rocks, two days teaching these savages to speak English." He then said: "Send a man to take my job."

At one time I had an Irishman running a freight train on a branch that had been laid with iron rails during the Civil War, and the track had not been relaid. He was handling a small circus, and one car in that circus train had a box for the elephants. The other half of that same car was for the seats and tents and other impedimenta. The train struck an unusually low joint on this branch and it turned over. In the telegraph report which was sent to me in code giving the description of the accident, the cause came finally at the end as follows: "The car wobbled, and the elephant stepped on the wobble."

I remember at one time when I had an Irish superintendent, a report came in of some particularly absurd thing some man had done, so I endorsed on the bottom of the report to this superintendent what the discipline should be, and he endorsed under that: "I have credited him with 10 demerits."—From an address by Carl R. Gray, president, Union Pacific, before the Associated Traffic Clubs at Chicago, May 6.

NEWS

Transport Study by U. S. Chamber of Commerce

Survey designed to evolve proposals for co-ordination in public interest

Stating that "the nation's transportation problems present a question that demands major attention," the board of directors of the Chamber of Commerce of the United States has announced that the chamber will make a thorough study of new transportation developments and changes with a view to putting forward proposals for better co-ordination of all transportation agencies in the public interest. This is part of a program of operations adopted by the board for the coming year. It proposes to get first-hand information and suggestions from all branches of transportation and from the transportation using public.

"New and changing relationships between the carriers call for a reappraisal of the part that each of these agencies should play, as well as for a re-examination of the type and extent of public regulation," the statement says.

"The forms that governmental regulation will take in the future will have a marked bearing on competitive conditions as between the several carriers. There is the question as to whether governmental participation in certain forms of transportation is on an equitable basis and whether governmental charges are fair. . . . The provisions of the Transportation Act will be reviewed to determine if revisions are needed."

The board also issued a statement on current economic problems saying that:

"Public confidence in railroad and other securities should be strengthened by fair earnings on vast publicly-regulated investments. The Chamber's membership has repeatedly declared that the rates charged for transportation should yield an adequate return on the fair value of the property used by the railroads for transportation."

Connection with Electric Ry. Required

The Interstate Commerce Commission has issued an order on a complaint by the Chamber of Commerce of Sapulpa, Okla., requiring the construction and operation of a suitable track for the interchange of freight cars between the lines of the St. Louis-San Francisco and the Oklahoma Union, an electric railway, at Sapulpa. The expense is to be borne by the Oklahoma Union except the expense of the switch and turn-out, which is to be borne by the Frisco.

New Container Rates Proposed

The New York Central and the Pittsburgh & Lake Erie have applied to the Interstate Commerce Commission for authority to establish the new basis of rates for container service prescribed by the commission recently following an extensive investigation, so that the rates will become effective on July 20 on five days' notice. The commission ordered the present rates concelled on that date but authorized the continuance of the service on a basis of not less than third class on the net weight of the contents.

I. C. C. Upheld by Court in Grain Rate Findings

Decision dismisses restraining order and denies injunction to carriers

The United States District Court at Chicago on June 30, handed down a decision dissolving the temporary order granted to the western roads on May 7, restraining the Interstate Commerce Commission from placing in effect reduced rates on grain and grain products on June 1. The court also denied the carriers' application for a temporary or interlocutory injunction against the Commission's grain rate order. The decision was signed by Judge William M. Sparks of the United States Circuit Court, and Judge Charles E. Woodward of the District Court, who sat in the case with Judge Walter O. Lindley of the District Court.

The decision pointed out that there is no allegation or claim by the railroads that the new grain rates prescribed by the Commission are unreasonable, that they will not fully compensate the carriers for the transportation service rendered, or that under existing rates, grain in the western district was not bearing more than its share of the traffic and transportation burden. The court also held that the Commission did not misconstrue, misinterpret or misapply the Hoch-Smith resolution and that it gave proper consideration to and made the proper interpretation of all the applicable law.

The Commission did not exceed its powers and authority in the original proceedings, nor did it act arbitrarily or in disregard of any legal right of the railroads, the court said. The court also upheld the Commission in its denial of the several motions for rehearing, reargument and modification of the rate revision order.

Colleges Join Bankers To Aid the Railways

Represented on new committee formed to intervene on pending rate case

The movement to support the railways in their pending petition for a 15 per cent increase in freight rates gathered further momentum during the past week when representatives of universities joined with financial interests in the formation of a committee designed to further the railway cause. The financial interests involved included representatives of insurance companies, trust companies and other fiduciary organizations. Co-incidentally, the New York State Bankers Association, at its Thirtieth Annual Convention, passed a resolution endorsing the present efforts to increase the earnings of the railroads while the committee on internal trade and improvement of the Chamber of Commerce of the State of New York made public an interim report approving the railroad petition.

The committee which includes the university representatives was formed at a meeting in New York City on June 26. It is known as the Security Holders Committee on the Railroad Emergency; Fairman R. Dick of Roosevelt & Son is chairman and Charles E. Hughes, Jr., is counsel. This body, which includes financial officers of Harvard, Yale, Princeton, Rochester, Vanderbilt and Stanford universities, intends to intervene in the hearings on the railroad petition before the Interstate Commerce Commission. A statement following the organization meeting of this committee held that "the distress in the country's largest industry has had an effect on, and intensifies the duration of the depression. . . . As the railroads are the backbone of the transportation industry of this country and as it would be a national calamity if this country were to lose the splendid service that is now being rendered by the railroads, the present uncertainty as to the credit of the railroads affects not only investors but practically the entire industry of the country." The seriousness of the situation is next stressed along with the necessity of presenting an accurate picture to the Interstate Commerce Commission in order to obtain "a prompt correction of these distressing conditions."

The resolution of the New York State Bankers Association read as follows:

"Both by reason of our recognition of the fact that our railroad systems are

among the most important of our industries, and because a large proportion of our depositors' funds is invested and should be invested in railroad properties, we commend the efforts being made to restore to this great industry sufficient earning power to produce adequate return on the capital required for its successful operation."

The interim report of the committee on internal trade and improvements of the Chamber of Commerce of the State of New York will be submitted to the Chamber at its next regular meeting to be held October 1. Among the signers of this report is Thomas F. Woodlock, former member of the Interstate Commerce Commission and now contributing editor of the Wall Street Journal. The report sets forth that the Chamber on June 3, 1920, adopted a resolution favoring an increase in freight rates and that an emergency now exists similar to that of 1920. The committee therefore believes that the chamber will again approve a freight rate advance as they did then "in order that the carriers may be enabled to perform their public duty of supplying proper facilities and service, and of preserving the country's financial stability and industrial future.

The report continues to point out that notwithstanding the most drastic economies in operation, the railways must have additional revenue to protect their credit, and that the only way expenses could be further curtailed, would be through a wage reduction. The reluctance of all to have recourse to this latter, the report says, leaves an increase in freight rates as "the only available remedy."

Wayne Butterbaugh Dies

Wayne E. Butterbaugh, professor of transportation of the University of Minnesota, and a vice-president of the Associated Traffic Clubs of America, died of pneumonia at Minneapolis, Minn., on June 25 at the age of 39 years. Mr. Butterbaugh was formerly an assistant traffic manager of the United States Shipping Board.

Two-Cent Fares Cancelled

The Atchison, Topeka & Santa Fe has been authorized by the Kansas Public Service Commission to cancel (July 1) the two-cents-a-mile coach fares established in the state to meet the reduction made by the St. Louis-San Francisco. The Frisco had previously been authorized to discontinue the reduced fare, since it had failed to produce the anticipated increase in business.

The Chicago & North Western, which placed two-cents-a-mile passenger fares in effect on certain lines in January, discontinued the low rate on July 1.

Reduced Rates on Canned Goods Suspended

The Interstate Commerce Commission has suspended from July 1 to February 1, 1932, a reduction proposed by the transcontinental railroads in the rates on canned goods from Pacific Coast and intermediate territory to destinations in the mid-western section of the United States. It was proposed to reduce from $1.28 to $1.05 the rate to Kansas City and Chicago applicable to a minimum weight of 40,000 lb. and from $1.05 to 90 cents the rate applicable to a minimum weight of 60,000 lb.

A Centennial at West Chester, Pa.

The Pennsylvania announces the one hundredth birthday of the West Chester Railroad, nine miles long, which was started in May, 1831, and in July of 1832 had three miles of track completed. This line is now the West Chester branch of the Philadelphia division, the northern terminus being at Frazer on the main line, 24 miles west of Philadelphia. The original terminus was at Malvern, two miles east of Frazer. Horses were used as motive power on this branch until 1845, the first rails being iron straps on yellow pine girders.

Alton Seeks to Operate Air Line

Responding to the action of two air lines, which are seeking to secure from the Illinois Commerce Commission certificates of public convenience and necessity permitting the carrying of intrastate passengers between points in Illinois on the interstate lines operated by these companies between Chicago and St. Louis, Mo., the Chicago & Alton will appear before the commission at Springfield, Ill., on July 14, with the request that, if the commission decides to assume jurisdiction over the air lines and to issue a certificate, the certificate be issued to the Alton. According to W. G. Bierd, receiver for the Alton, the railroad is willing to provide any type of transportation service desired by the public, and feels that it should have a prior right to do so because of its long standing as a common carrier between Chicago and St. Louis.

One Hundred Twenty-Five Car Train of Redwood

The Redwood Empire Special, made up of 125 cars of redwood lumber, left Sacramento, Cal., on July 1 for eastern points. The train, which is also known as the Prosperity Special is being moved over the Southern Pacific, the Union Pacific and the Chicago & North Western to Chicago, from which point it will go east over the Pennsylvania. The train is scheduled to arrive at Omaha, Neb., on July 6 and Chicago on July 7. Approximately 25 cars will be cut out at Omaha and 30 between Omaha and Chicago, while the remaining 70 will continue to New York and other eastern cities.

Correction

In our report of the recent convention of the American Association of Railroad Superintendents on page 1187 of the *Railway Age* of June 20, we inadvertently omitted reference to the election of M. L. Hayes, assistant general superintendent of transportation of the Missouri Pacific, as third vice-president of the association. The officers of the association are as follows: President, C. Forrester, general superintendent, C. N. R., Saskatoon, Sask.; first vice-president, Victor Parvin, general superintendent, Wabash, St. Louis, Mo.; second vice-president, F. O. Coleman, superintendent, M. & St. L., Oskaloosa, Iowa; third vice-president, M. L. Hayes, assistant general superintendent of transportation, Missouri Pacific, St. Louis, Mo.; fourth vice-president, C. I. Luque, superintendent of transportation, Mexican Ry., Mexico, D. F.; secretary-treasurer, F. O. Whiteman, St. Louis, Mo.

Shippers' Board Dates

The Mid-West Shippers' Advisory Board will hold its twenty-fifth regular meeting at Green Bay, Wis., on July 9.

The regular meeting of the Northwest Shippers Advisory Board will be held at Sioux Falls, S. D., on July 23.

The Montana division of this board will meet at Great Falls, Mont., on July 15.

The program of the Mid-West board meeting includes addresses by A. J. Goedjen, manager of the Wisconsin Public Service Corporation and president of the Wisconsin Utilities Association, and by F. E. Winburn, of the Freight Claim division of the American Railway Association.

Four New Michigan Commissioners

Four new members of the Michigan Public Utilities Commission have been appointed by Gov. Wilber M. Bruckner to succeed four members whose terms have expired. The only one of the five members of the former commission to be reappointed was Robert H. Dunn. Kit F. Clardy, an assistant attorney general, was appointed to succeed Alva M. Cummins; Harold J. Waples, state commissioner of pardons and paroles, to succeed Russell A. Gorman; Harry C. McClure of Flint, Mich., to succeed Samuel Odell, and Edward T. Fitzgerald of Detroit, Mich., to succeed James Bice.

Shippers Estimate Reduced Carloading

Shippers of the country, through estimates just submitted to the Shippers' Regional Advisory Boards, anticipate that carload shipments of the 29 principal commodities in the third quarter of 1931 will be approximately 7,082,186 cars, a reduction of 724,851 cars or 9.3 per cent below the corresponding period in 1930. It is estimated that of the 29 commodities, increases in transportation requirements will develop for five, as follows: Citrus fruits; other fresh fruits; potatoes; other fresh vegetables, and petroleum and petroleum products. Commodities for which a decrease is estimated totaled 24, as follows: Grain; flour, meal and other mill products; hay, straw and alfalfa; cotton; cottonseed and products except oil; livestock; coal and coke; poultry and dairy products; ore and concentrates; gravel, sand and stone; salt; lumber and forest products; sugar, syrup and molasses; iron and steel; machinery and boilers; cement; lime and plaster; brick and clay products; agricultural implements and vehicles other than automobiles; automobiles, trucks and parts; paper, paperboard and prepared roofing;

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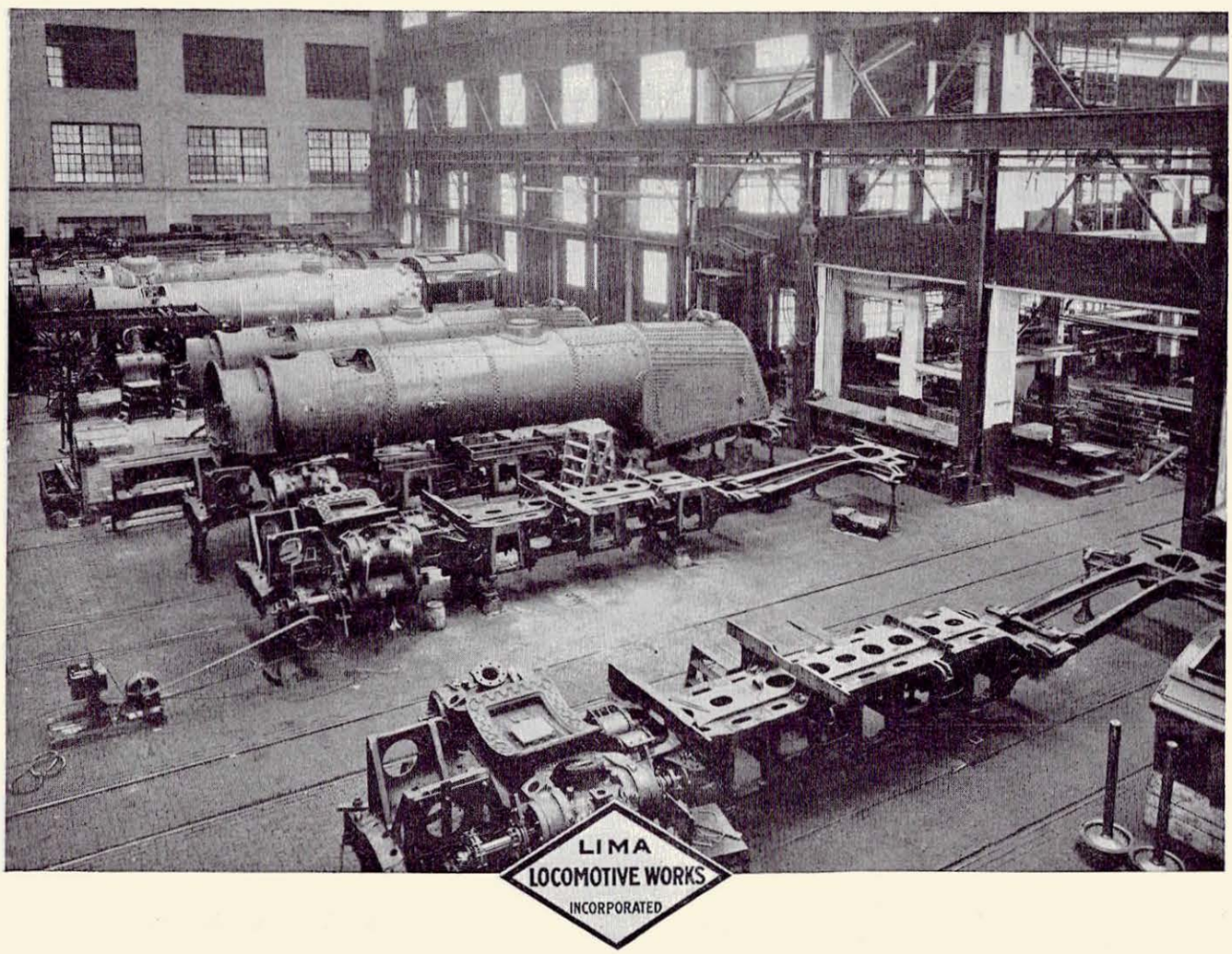
POWER
in the making



A FEW of the Boston and Albany Railroad
Super-Power "Hudson" Type Locomotives
in the process of construction by Lima.

LIMA LOCOMOTIVE WORKS • Incorporated • LIMA, OHIO

fertilizers of all kinds; canned goods, and chemicals and explosives.

N. Y. Central Train-Plane Service

Through a reciprocal arrangement, which becomes effective at once, the New York Central and the Century Air Lines are joining to provide air-rail service between eastern cities and middle western points. Trains and planes will meet at Cleveland, Ohio, the New York Central carrying passengers between Cleveland and eastern cities, and the Century Air Lines conveying them from Cleveland to Detroit, Chicago, St. Louis, and other cities on the Century system. Through tickets covering transportation on both trains and planes will be sold in New York Central ticket offices and in the ticket offices of the Century Air Lines.

Temporary Suspension of Texas Motor Truck Law

According to press reports, a temporary suspension of enforcement of the new Texas law regulating the size and load of commercial motor trucks has been ordered by the chief of the Texas highway patrol, pending a decision in a test case to determine the constitutionality of the law, and also pending a ruling by the attorney general on the effective date of the act. The attorney general has been asked to decide whether the law, recently signed by the governor, should become effective immediately or 90 days after its passage.

Moffat Tunnel Bonds Again Approved

The $8,750,000 of supplemental bonds issued to complete the construction of the Moffat tunnel in Colorado were again declared to be valid in a decision handed down by Judge E. V. Holland of the United States district court at Denver, Colo., on June 26. The Denver Land Company, the plaintiff in the case, plans to take the case to the Colorado supreme court.

This decision represents the latest development in an extended litigation in which Judge Robert G. Smith of the federal district court handed down a similar decision in October, 1928. When the case was appealed to the state supreme court that body reversed the lower court's decision in January, 1930, and directed that the bondholders be made defendants and that a new trial be held.

Central Western Shippers' Board

Commodity committee reports submitted at the annual meeting of the Central Western Shippers' Advisory Board at Ogden, Utah, on June 23, estimate a decrease of 2.8 per cent in carloadings for the third quarter of 1931 as compared with the same period last year. The board adopted a recommendation of the executive committee calling for the establishment of a freight claim prevention committee to be composed of five shippers and the members of the railroad contact committee. The board also adopted a report of the agricultural council committee recommending that interstate discussions of an alfalfa weevil quarantine be continued and agreeing to appeal for federal investigation and regulation if state quarantine proved to be unsatisfactory.

Low Rates on Cotton in South Carolina

Reduced freight rates on cotton moved within the state of South Carolina, announced by the Seaboard Air Line to go into effect on June 27, are in many cases more than 50 per cent under the old rates. The new rates, which are made to meet the competition of trucks, and which apply to both compressed and uncompressed cotton, are based strictly according to mileage, the rate for 50 miles or less being 15 cents per 100 lb.; 100 to 120 miles, 24 cents; 200 miles, 40 cents; 250 miles, 50 cents, etc. Samples of the new rates to Charleston are: from Camden, 139 miles, old rate 53 cents, new rate 30 cents; from Cheraw, 142 miles, old 53, new 30; Columbia 129 miles, old 40, new 30; Denmark, 82 miles, old 40, new 19; Georgetown, 74 miles, old 38, new 18; Lanes, 54 miles, old 34, new 16; Sumter, 94 miles, old 42, new 20.

C. P. R. May Net Higher

Net earnings of the Canadian Pacific for the month of May were $1,445,945, against $1,206,621 in the like month of 1930, an increase of $239,324, and the first since January of the current year. This gain in net was entirely the result of effecting substantial economies in operation, for gross revenues at $12,084,643 for the month were $2,932,359 below the corresponding month of 1930. Operating expenses were cut from $13,810,381 in 1930 to $10,638,697 in May, of the current year. During May the operating ratio was 88.04, against 91.96 in May of 1930.

For the five-month period ended with May gross revenues were $58,065,258, a decline of $11,148,054. Expenses were cut also, but not quite to the same extent, and as a result net for the five months stands at $5,951,697, a reduction of $827,908 from the five-month period of 1930. For the latter the operating ratio was 90.21, against 89.75 this year.

Revision of Southern Meat Rates Recommended

Modifications in some instances in the new basis of rates on fresh meats and packing house products proposed by the railroads for application in, to and from southern territory are recommended by Examiners Chester E. Stiles and Arthur S. Parker in a proposed report to the Interstate Commerce Commission made public on June 30. The rates were originally to become effective on February 2, 1929, but were suspended and later voluntarily postponed until September 2, 1931. Proposed ratings in southern classification on packing house products, in carloads, would be found not justified, according to the examiners' recommendations, and they recommend that a seventh class rating be found reasonable. Proposed carload commodity rates in southern territory they recommend be found justified to the extent that they do not exceed on fresh meats 47.5 per cent of first class and on packing house products 35 per cent of first class. A similar basis is proposed for rates between official and Illinois territories on one hand and southern territory on the other. Arbitraries are recommended for use in making rates between southern territory and western trunk line and southwestern territories and to and from the Florida peninsula.

Declaration of Policy Discussed by Shippers

As a result of a discussion of the declaration of policy of the Association of Railway Executives, by a subcommittee of the executive committee of the National Industrial Traffic League and the Advisory committee of the Railway Executives' Association at Chicago on June 25, the formal reply of the league to the declaration, which has been expected for some time, is being withheld. The purpose of the meeting was to permit the interested parties to discuss the subject, to arrive at a common understanding and to develop clearly what differences of views are actually irreconcilable as between the shippers and carriers. Both parties to the conference appointed committees to continue the conferences in the hope that agreement on a program will be accomplished after the facts are fully set forth.

To Start Dotsero Cutoff in 1931

Construction of the Dotsero cutoff between Craig, Colo., the terminus of the Denver & Salt Lake, and Dotsero, on the Denver & Rio Grande Western, 41 miles, will be started during 1931 by the Denver & Rio Grande Western, contingent upon approval of the project by the Interstate Commerce Commission, J. S. Pyeatt, president of the latter road, stated at Denver, Colo., on June 27. If commission approval is given, the cutoff will be built by the D. & R.G.W. and it is expected that operation over it can be started by the end of 1932. An agreement has also been reached for trackage rights for the D. & R.G.W. from Denver over the Denver & Salt Lake to Craig through the Moffat tunnel. Upon approval of the project by the Interstate Commerce Commission, the D. & R.G.W. will acquire from the D. & S. L. the right-of-way of the Denver & Salt Lake Western, which was incorporated as a construction subsidiary.

N.I.T. League Acts on Rate Increase

The executive committee of the National Industrial Traffic League, at a meeting at Chicago on June 26, decided by a vote of 16 to 15 not to file an intervening petition with the Interstate Commerce Commission in the case in which the railroads are seeking an increase of 15 per cent in freight rates. The resolution before the committee called only for the filing of an intervening petition with the idea of bringing out all the facts in connection with the proposed increase, and was not intended to put the league on record as opposing or supporting the carriers' petition.

Directors of the American Farm Bureau Federation, at a meeting in Chicago on the

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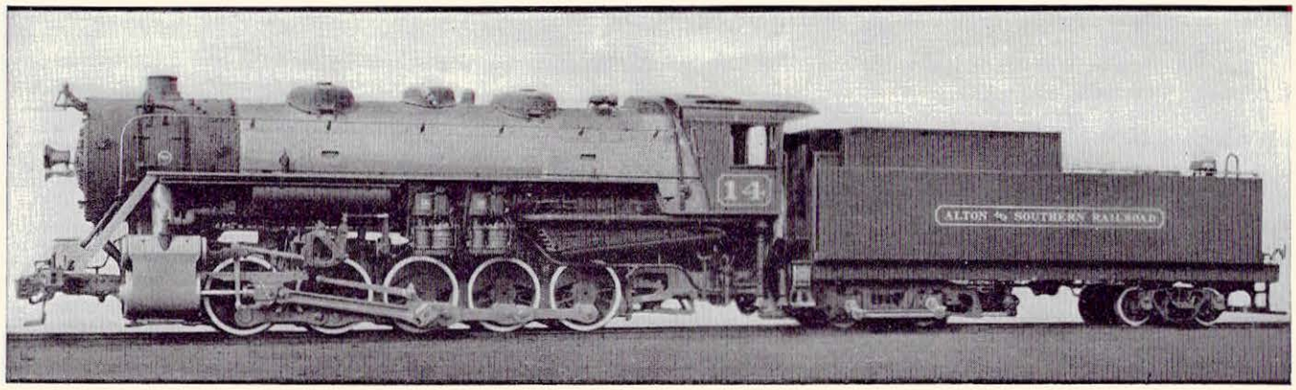
ALUMINUM To Reduce Weight...



The BOOSTER to increase power...

This ten-wheel switcher—a most modern piece of motive power—recently was delivered by *Baldwin* to the *Alton & Southern*, a subsidiary of the Aluminum Company of America, for transfer service.

Two features of its design are—the extensive use of aluminum and aluminum alloys, to reduce weight on drivers—and the application of the BOOSTER to the tender to increase power.

Aluminum parts are estimated to reduce weight on the driving wheels about 10%. The BOOSTER, with an added tractive force of 15,800 pounds increases power 19.6%. It, also, has many parts made of aluminum and aluminum alloys.

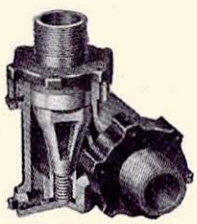
Modern switchers such as this, start heavier loads and speed-up switching operations. The reserve power of the BOOSTER is of special value on hump yard operations. Longer trains are moved over the hump without cutting, helper engines are eliminated, congestion is relieved and yard tonnage increased.

Switching engines of the future, like road engines, will have greater power per pound of weight—the BOOSTER is an essential element in this development.

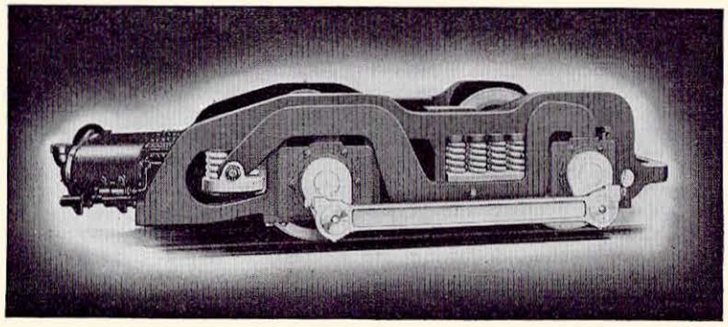
It makes everything else more productive.

FRANKLIN RAILWAY SUPPLY COMPANY, Inc.

NEW YORK
CHICAGO
ST. LOUIS
SAN FRANCISCO
MONTREAL



THE FRANKLIN SLEEVE JOINT does not become rigid under pressures.



same day, decided to oppose the carriers' application, claiming that it will injure agriculture more than any other class of industry. The federation will file protests with the commission and with state regulatory bodies.

On the previous day the Brotherhood of Railroad Trainmen endorsed the petition of the railroads.

Wisdom of New Montreal Terminal Defended

A vigorous defence of the new Central Terminal in Montreal was made by Sir Henry Thornton, president of the Canadian National, and other officers of the road before the House Committee on National Railways at Ottawa last week. There have been some questions as to the need of spending $50,000,000 on this work, and many have stated that the cost would not stop at $50,000,000, but Sir Henry stated most positively that that would be the entire cost.

Sir Henry said that the investment will more than carry itself with reduction in expenses, and increased savings. Vice-President S. J. Hungerford compared the development to that of Grand Central Terminal at New York and S. W. Fairweather, director of the C. N. R's. bureau of economics itemized the earnings from the investment at the end of five years as follows:

Air rights	$500,000
Better passenger facilities	100,000
Co-ordination of freight facilities, a very important item	200,000
Electrification of the terminals, which will be made possible by the new terminal scheme	225,000
Additional freight, due to the fact that we will have thrown into intimate contact with our railways in Montreal industrial territory, particularly in the East end of the city where we are now at a very great disadvantage in servicing industry	900,000
Construction of the belt-line	95,000

He gave the total savings at the end of five years as $2,205,000 and $5,500,000 at the end of ten years.

Railroads in the Chicago World's Fair

Plans by which the railroads of the United States may present the story of their service at the Century of Progress Exposition in Chicago in 1933 are being considered by a number of individual roads. Through the co-operation of the American Railway Association, a committee headed by Daniel Willard, president of the Baltimore & Ohio, has given valuable assistance to officers of the 1933 World's Fair in developing plans for participation. Other members of this committee are: L. A. Downs, president of the Illinois Central; F. W. Sargent, president of the Chicago & North Western; F. E. Williamson, president of the Chicago, Burlington & Quincy; J. E. Gorman, president of the Chicago, Rock Island & Pacific; Carl L. Gray, president of the Union Pacific; and W. R. Cole, president of the Louisville & Nashville.

The Travel and Transport building is now virtually completed. A section of the main Travel and Transport building has been allotted for disposition to individual railroad companies. The Baltimore & Ohio, has purchased a block of exhibit space in this section for its display.

Exhibits of railway equipment, railway supplies and railway engineering, it is planned, will be closely associated with exhibits of the railroad companies themselves in the Travel and Transport building. A section of this building has been allotted for industrial exhibits by manufacturers and distributors of these products.

Railroad Taxes in Washington

A suit brought by the Northern Pacific, the Spokane, Portland & Seattle and the Chicago, Milwaukee, St. Paul & Pacific against all counties in the state of Washington through which their lines pass, and contending that their property is and has been over-valued, will be tried before Federal Judge J. Stanley Webster at Spokane, Wash. Judge Ralph Kauffman, special master in chancery at Ellensburg, after hearings and studies extending over two years, has reported findings to the effect that railroads should be valued according to their securities and that the value should be pro-rated to the different states and counties according to the road's mileage therein. In the case of the Spokane, Portland & Seattle, the master found the line's value should be determined by capitalizing the net earnings at seven per cent. The counties contend that the cost of reproduction, less the depreciation of the railroad properties, should be considered in determining values, and the results should be checked by using the stock and bond method and the capitalization method.

New York Railroad Club Outing

The summer outing of the New York Railroad Club was attended this year by 575 members of the club and their guests. This outing combined both the golf tournament and the field sports, all in one place for the first time, at the grounds of the Westchester Country Club, Rye, N. Y. The chief enthusiasm was as usual centered in the golf games and tournaments, the players having started early in the day, and continued until its close. The regular annual golf tournament, which was open to members and guests, provided for the awarding of a number of beautiful and useful prizes. Prizes were also presented to winners of other events.

The second annual open team championship for railroad and railroad supply companies was won by the American Brake Shoe & Foundry Co. The exhibition match was closely followed by a large gallery. The contestants in this foursome were Jess Sweetser and Gene Tunney versus R. A. Jones, Jr. and George Voight. The match was won by Jones and Voight—4 up and 2 to play. The other golfing events included driving and putting contests for those who played in the golf tournament; also similar contests for non-golfers. In the evening, the Westchester Country Club provided a dinner at 7:30, during which time, following the address of George LeBoutillier, president of the New York Railroad Club, prizes were awarded to the successful contestants in the various events. The committees this year were in charge of J. S. Doyle, general chairman; Maurice N. Trainer, golf chairman; and Thomas P. O'Brian, field chairman. The attendance included in addition to a number of railroad executives, many railroad men and those from allied manufacturing industries.

B. & M. Foreign Trade Plan

The Boston & Maine has entered a contract with the Bush Service Corporation whereby the offices of the latter in 23 foreign countries will become agencies for the railroad in connection with a program for the development of foreign trade in the interest of New England industries, New England ports and the railroad.

The program will be organized as an aid to industries, according to the railroad's statement, for "(a) the creation and extension of commercial contacts to promote the sale of New England products; (b) the transportation, storage and distribution of merchandise and (c) the financing, in cooperation with bankers, of these sales and the movement of the products. It will direct shipments, both import and export, through the New England ports served by the Boston & Maine; and otherwise will be operated to give the railroad benefits in the movement of goods through other ports. The services in sales promotion 'will be without charge to New England industries; and while neither the railroad nor its agents can attempt to actually sell goods, they can and will aid in promoting sales outlets.'"

Administration of new service will be in the freight traffic department, which developed the plan; and Freight Traffic Manager J. W. Rimmer has announced the appointment of Captain Frank W. Rourke, superintendent of the Mystic Terminal Company at Boston, as assistant freight traffic manager of the Boston & Maine in charge of the railroad's expanded program. He will have charge also of the Boston and Maine's coastwise and intercoastal business, at the same time that he continues in charge of the Mystic and Hoosac port terminals at Boston, which are operated as a subsidiary of the railroad.

Sees Prosperity's Return If Freight Rates Rise

"Forty-four cents of every dollar of money you have paid on your life insurance policies are invested in railroad bonds," so Vice-President Cornwell of the Baltimore & Ohio told Rotary Clubs of Piedmont and Kayser, W. Va., on June 26. "Under the law, a corporation must earn one and one-half times its fixed charges for its bonds to be eligible for savings investments. The railroads are not meeting that requirement; not earning anything like that amount. If their earnings cannot be increased and these billions of dollars of their securities had to be dumped onto an already weakened market, can you imagine the effect on the price of all securities and all commodities as well, for you must remember wheat, cotton, copper, steel and all commodities go up and down as securities rise or

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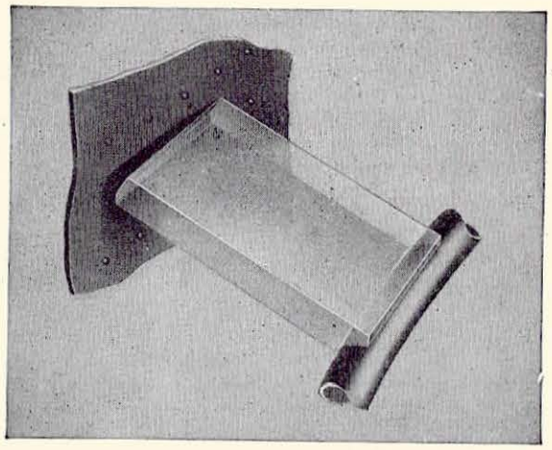
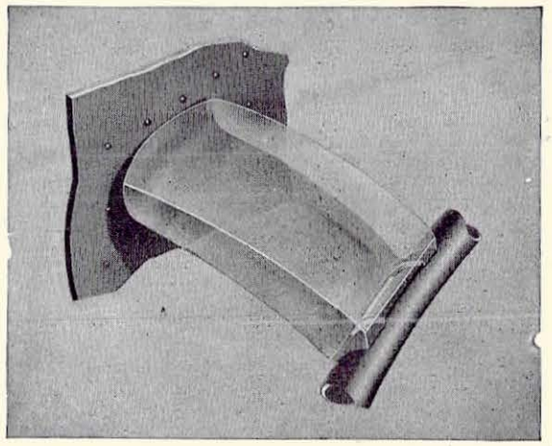
THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK





A Stable Support: Compare the Bevelled End Arch Brick with the square end brick above it. Note the superior stability resulting from the contact of the Bevelled End with the side sheet.

A "TROUBLE-SAVER" Developed by American Arch Company

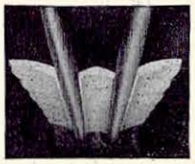
Making it easy to do a repair job saves trouble for the workman and saves money for the road.

"Sled-Runner End" Brick made it easy for the Arch gang to get a stable support for side brick without chipping and fitting—a laborious and time eating job.

This development of American Arch Company is just one result of the varied benefits that concentration on the subject of locomotive Arches has given the railroads.

By studying every step from brick manufacture to performance in service, American Arch Company has brought the Locomotive Arch to its present high state of development. This work has had a real dollars and cents value and is still in progress.

HARBISON-WALKER REFRACTORIES CO.
Refractory Specialists



AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion Specialists

fall? Not only would railroad credit be destroyed and future financing made difficult, if not impossible, but the general result would be little short of appalling. Heavy losses would be inflicted on insurance companies, a matter of interest not only to the holders of the sixty million insurance policies outstanding in this country, but, likewise, to their dependents, their wives and children.

"In view of these things, what could the railroads do but go to the Interstate Commerce Commission and ask for a freight-rate increase?

"The way to end this depression and restore normal business conditions is to stop the decline in prices and turn them upward. When prices are declining purchases are deferred. People wait for lower prices and, by waiting, they get them for others are forced to sell. If prices begin to rise people buy, not only what they want today but in anticipation of their needs, lest prices go higher. So, if you can find any way to stop the decline in prices, do it. Doubtless that is what the Cleveland Chamber of Commerce had in mind when it said in a resolution that a freight-rate increase is the key that will unlock this business depression and allow prosperity to enter."

H. E. Boardman Appointed to Yale Railroad Professorship

Howard E. Boardman, construction engineer of the Boston & Maine since 1929, was appointed Dudley Professor of Railroad Engineering at Yale University effective July 1. The Dudley endowment fund was established by the late Lucy B. Dudley and by an additional bequest of her husband, the late Dr. P. B. Dudley, who was for many years consulting engineer of the New York Central Lines and one of the foremost authorities in this country on the subject of steel rails. The Dudley professorship was established specifically to embody research in railroad engineering problems through work in conjunction with railroad officials and experts.

Professor Boardman was graduated from the Sheffield Scientific School, Yale University, in 1899. The same year he entered the service of the Pennsylvania as instrumentman on preliminary surveys for branch line construction in central Pennsylvania and New Jersey. He became assistant on the engineer corps for the Pennsylvania, lines west of Pittsburgh, in 1901. From 1902 to 1909, Mr. Boardman served successively as chief of party, assistant engineer and senior assistant engineer on the North River tunnels of the Pennsylvania. He served as senior assistant engineer and division engineer, maintenance of way department, of the Missouri Pacific from 1909 to 1912, then becoming chief assistant engineer of the Buenos Aires Western Railway. In 1916 he was appointed engineering assistant to the general valuation counsel for the New York Central Lines. Mr. Boardman was out of railroad work from 1922 to 1929, serving successively as president and treasurer of Foster Merriam & Co., Meriden, Conn., from 1922 to 1926; as manager of engineering and sales for Divine Brothers Company at Utica, N. Y., from the latter date to 1928; and as manager of research and assistant to the president of the National Industrial Conference Board from 1928 to 1929. He was appointed construction engineer of the Boston & Maine in 1929, the position he held at the time of his appointment to the Dudley Professorship.

I.C.C. Examiner Recommends Denial of Fourth Section Application on Sugar

Reductions in the rates on sugar from San Francisco Bay points to Chicago, St. Louis, Milwaukee and related points, as proposed by the transcontinental railroads in a fourth-section application for the purpose of meeting water competition via the Panama canal, would only cause losses in revenue, said Examiner W. A. Disque of the Interstate Commerce Commission in a proposed report, recommending denial of the application. It had been proposed to reduce the present rate of 84 cents to 65 cents to Chicago and Milwaukee and 67.5 cents to St. Louis, and the roads had also asked authority to make further reductions down to a minimum of 48 cents, if necessary to meet further reductions by the water lines. The traffic which applicants are seeking, Mr. Disque said, is traffic which for the most part has been developed by the Panama canal lines and does not particularly represent traffic that has been drawn away from the rail lines. "The indications are that such a large volume of sugar will always move all-rail that fourth-section relief with its objectionable possibilities is not worth while."

The report said that in addition to being based on water competition the application was based on long existing market competition between the San Francisco Bay refiners and Atlantic seaboard and Louisiana refiners; that the sugar traffic through the Panama canal to the destinations in question had increased to 50,212 tons in eleven months of 1930 but that if the proposed rates had been affective in 1930 and the applicant railroads had obtained all the sugar that went through the Panama canal, in addition to what they did get, about 70 per cent of the total, the net revenue from all this traffic would have been less than they received at the present rate. He pointed out that while an all-rail shipment to the destinations in question is ordinarily in transit from a week to 12 days, the Panama canal routes generally require between five and six weeks to make delivery. The application was opposed by Atlantic seaboard and Louisiana refiners, two barge lines operating on the Mississippi river, various intercoastal steamship lines, the eastern and southern rail lines and the Missouri-Kansas-Texas. The protesting rail lines and the barge lines expressed fear that there would be an increased movement from San Francisco by rail and a reduced movement from points on their lines and that their rates might have to be reduced 30 or 40 per cent to protect the refiners they serve. According to the report the proposed rates would "no doubt, yield much in excess of the out-of-pocket costs incident to handling the additional traffic sought," commonly regarded as about half the total expenses, and estimated at about 26 cents via the shortest route to 35 cents via the longest route. It was estimated that the ton-mile earnings at the proposed rates would average at least 5 mills.

Air-Conditioned Diners on P. R. R.

Designed to increase the comfort of passengers by reducing the heat and noise of summer travel, the Pennsylvania has recently placed in service its latest type dining car equipped with an entirely new air conditioning system. The new type car, which circulates cooled and purified air regulated to any desired temperature, will operate on some of the Pennsylvania's de luxe passenger trains.

Preliminary tests have shown the possibility of maintaining a temperature of 76 degrees Fahrenheit with an outside temperature of more than 100 degrees. Under actual service conditions, the interior of the car can be kept at least 12 degrees below the outside temperature, when desired.

Maximum insulation against cold as well as heat is embodied in the air conditioning system. The heating and cooling systems are entirely separate. Accoustic felt has been used to line the interior of the car, materially decreasing train noise, in addition to providing insulation.

The air cooling system in dining cars of this new type consists of an ice chamber under the car, cooling radiators through which ice cold water from the chamber is circulated, and blowers for circulating the cooled air through the radiator coils into the car.

As the cool air is driven by fans into the car through vents located near the ceiling, the warm air is withdrawn through grilled openings skillfully fashioned into the wall design of the car. By a series of ingenious ducts, this air is reconditioned and mixed with fresh air brought in through intakes located on each side of the car. The fresh air is scientifically cleaned and controlled by strainers and dampers as it passes through the intake.

Because of the automatically controlled mixing and cooling of the car's air supply, the outer windows of the dining car are permanently sealed. Passageway doors prevent the entrance of heat through the outer doors and halls as diners enter or leave the car.

In keeping with the cooled condition of the car's atmosphere, decorations in gray tones, with blue trimmings, have been used in the interior design. Metal decorations are in silver, with walnut chairs and carpeting of blue and brown design.

Meetings & Conventions

The following list gives names of secretaries, date of next or regular meetings and places of meetings.

AIR BRAKE ASSOCIATION.—T. L. Burton, Room 5605, Grand Central Terminal Building, New York City.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, 836 S. Michigan Blvd., Chicago. To meet with Air Brake Association, Car Department Officers Association, International Railroad Master Blacksmiths' Association, International Railway Fuel Association, International Railway General Foremen's Association, Master Boiler Makers Association and the Traveling Engineers' Association.

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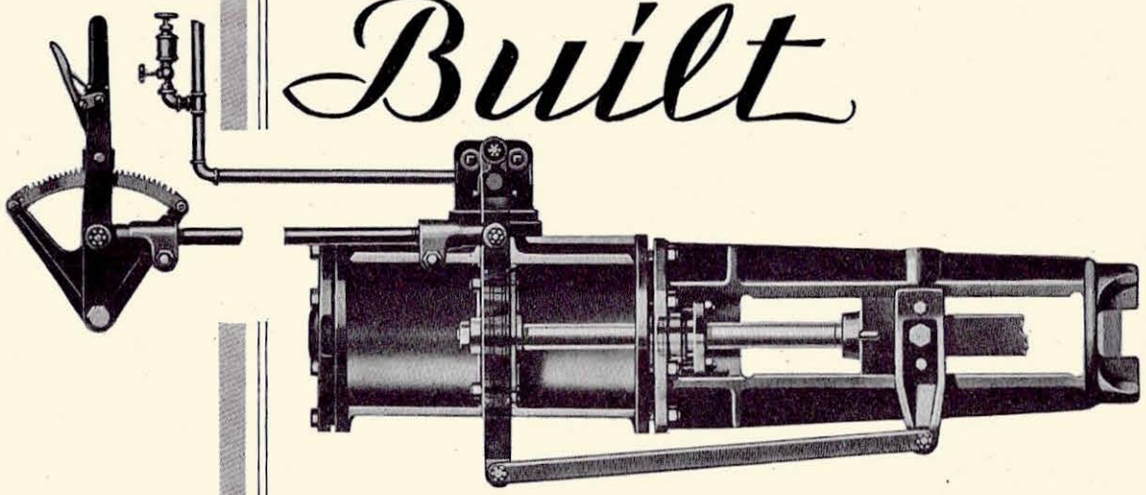
Alco Built



REVERSE gears are rapidly becoming recognized as essential equipment. But the growing demand for the Alco Reverse Gear in particular goes farther back than that.

To measure up to the needs of today for a fast, flexible and dependable gear for any service is the central idea around which Alco reverse gears are built. It serves acceptably in heavy freight service and responds equally well to the needs of high speed passenger requirements. Again, in fast freight, helper and switching service it gives quick and accurate valve gear adjustment.

With low initial cost, its simple and interchangeable construction eliminates expensive repair parts throughout a long service life.

In short, that extra measure of service which is inbuilt in every Alco product is fully embodied in Alco Reverse Gears.

American Locomotive Company

30 Church Street New York N. Y.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, F. T. R., M. & O. R. R., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 S. Michigan Ave., Chicago.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J. 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, St. Louis, Mo. Next meeting, 1932, Detroit, Mich.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I. & L. R. R., 836 Federal St., Chicago. Next convention, October 20-22, 1931, Baltimore, Md.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—Guy C. Hecker, 292 Madison Ave., New York. Next convention, September 26-October 2, 1931, Auditorium, Atlantic City, N. J.

AMERICAN RAILWAY ASSOCIATION.—H. J. Forster, 30 Vesey St., New York, N. Y.

Division I.—Operating.—J. C. Caviston, 30 Vesey St., New York, N. Y.

Freight Station Section. — R. O. Wells, Freight Agent, Illinois Central Railroad. Chicago.

Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York.

Protective Section.—J. C. Caviston, 30 Vesey St., New York.

Safety Section.—J. C. Caviston, 30 Vesey St., New York.

Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York.

Division II.—Transportation.—G. W. Covert, 59 East Van Buren St., Chicago.

Division III.—Traffic.—J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering.—E. H. Fritch, 59 East Van Buren St., Chicago. Next meeting, March 15-17, 1932, Palmer House, Chicago. Exhibit by National Railway Appliances Association.

Construction and Maintenance Section.—E. H. Fritch. Next meeting, March 15-17, 1932, Palmer House, Chicago.

Electrical Section.—E. H. Fritch.

Signal Section.—R. H. C. Balliet, 30 Vesey St., New York.

Division V.—Mechanical.—V. R. Hawthorne, 59, East Van Buren St., Chicago.

Equipment Painting Section.—V. R. Hawthorne, 59 East Van Buren St., Chicago.

Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y.

Division VII.—Freight Claims.—Lewis Pilcher, 59 East Van Buren St., Chicago.

Division VIII.—Motor Transport.—George M. Campbell, 30 Vesey St., New York, N. Y. Annual Meeting, October 27-28, 1931, Chicago.

Car Service Division.—C. A. Buch, 17th and H. Sts., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 20-22, 1931, Royal York Hotel, Toronto, Ont. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—A. W. Large, Gen. Agri. Agt., C. R. I. & P. Ry., Chicago, Ill. Next meeting, 1932, Louisville, Ky.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in co-operation with the American Railway Association, Division IV.—E. H. Fritch, 59 East Van Buren St., Chicago. Next meeting, March 15-17, 1932, Palmer House, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MAGAZINE EDITORS ASSOCIATION.—Miss E. Phillips, N. Y., N. H. & H. Magazine, Boston, Mass.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C., M., St. P. & P. R. R., 11402 Calumet Ave., Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.—E. E. Caswell, Union Twist Drill Co., 11 S. Clinton St., Chicago.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—R. E. Schindler, Secretary, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, Paul D. Mallay, Johns-Manville Corp., 292 Madison Ave., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 1104 Chandler Building, Washington, D. C. Next meeting, January 26-28, 1932, Hotel Jefferson, St. Louis, Mo.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, District Claim Agent. Northern Pacific Ry., St. Paul, Minn. Annual convention, May, 1932, Louisville, Ky.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley I. Strong, Transportation Building, Washington, D. C.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—S. A. Baber, High Grade Manufacturing Co., 10418 St. Clair Ave., Cleveland, Ohio. Meets with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2276 Wilson Ave., N. D. G., Montreal, Que. Regular meetings, 2nd Monday in each month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS ASSOCIATION.—A. S. Sternberg, M. C. B. Belt Ry. of Chicago, 7926 South Morgan Street, Chicago.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 W. 55th St., Chicago. Regular meetings, 2nd Monday in month, except June, July, and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF LOS ANGELES.—J. W. Krause, Room 299, 610 So. Main St., Los Angeles, Cal. Regular meetings, 2nd Monday of each month, except July, August and September, Room 299, 610 So. Main St., Los Angeles.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—F. G. Wiegman, 720 N. 23rd St., East St. Louis, Ill. Meetings first Tuesday of each month, except July and August, American Hotel Annex, 6th and Market Sts., St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—T. J. O'Donnell, 1817 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, 2nd Thursday each month, except June, July, August, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 453 E. 6th St., Cincinnati, Ohio. Meetings 2nd Tuesday in February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. L. Frericks, 14416 Alder Ave., Cleveland, Ohio. Meetings, second Monday each month, except July, August, September, Auditorium, Brotherhood of Railroad Trainmen's Building, West 9th St., and Superior Ave., Cleveland.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. T. Winkless, Room 700 La Salle Street Station, Chicago. Annual meeting, September 15-16, 1931, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn.

MASTER BOILER MAKERS ASSOCIATION.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—(See Car Department Officers Association.)

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—James B. Walker, 270 Madison Ave., New York. Annual convention, October 20-23, 1931, Richmond, Va.

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—Roy. M. Edmonds, 1252 Syndicate Trust Bldg., St. Louis, Mo.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 1014 South Michigan Ave., Chicago. Exhibit at A. R. E. A. convention.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: J. L. Walsh, Supt. Safety, M.-K.-T. R. R., Dallas, Tex. Annual congress October 12-16, 1931, Hotel Stevens, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2nd Tuesday in month, except June, July, August and September, Copley Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—D. I. McKay, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July and August, 29 W. 39th St., New York City.

PACIFIC RAILWAY CLUB.—W. S. Wollner, P. O. Box, 3275, San Francisco, Cal. Regular meetings 2nd Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1124 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION. — Frank W. Noxon, 1112 Shoreham Building, Washington, D. C.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1841 Oliver Building, Pittsburgh, Pa., Regular meetings, 4th Thursday in each month except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—Edward Wray, 9 S. Clinton St., Chicago. Meets with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R. Baltimore, Md. Annual meeting, October 20-22, 1931, Cleveland, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division. Purchases and Stores Division and Motor Transport Division, American Railway Association. (No exhibit at 1931 meetings.)

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A. Division 1.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa. Next convention, September 17-18, 1931, Statler Hotel, Buffalo, N. Y.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION. — T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Next convention, September 22-24, 1931, Hotel Stevens, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Drawer 24, M. P. O., St. Louis, Mo. Regular meetings, 2nd Friday in month, except June, July and August. Statler Hotel, St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack (Rockland Co.), N. Y. Meets with A. R. A. Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3rd Thursday in January, March, May, July, September and November. Ansley Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—R. G. Parks, A. B. & C. Ry., Atlanta, Ga.

SUPPLY MEN'S ASSOCIATION.—E. H. Hancock, Treasurer, Louisville Varnish Co., Louisville, Ky. Meets with A. R. A. Div. V. Equipment Painting Section.

TORONTO RAILWAY CLUB.—J. A. Murphy, 1405 Canadian National Express Building, Toronto. Regular meetings 3rd Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

TRACK SUPPLY ASSOCIATION.—L. C. Ryan, Oxweld Railroad Service Co., Carbon & Carbide Building, Chicago. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION. — W. O Thompson, 1177 East 98th St., Cleveland, O.

WESTERN RAILWAY CLUB.—J. H. Nash, Dri-Steam Valve Sales Corp., 122 S. Michigan Ave., Chicago. Regular meetings 3rd Monday each month, except June, July, August and September, Hotel Sherman, Chicago.

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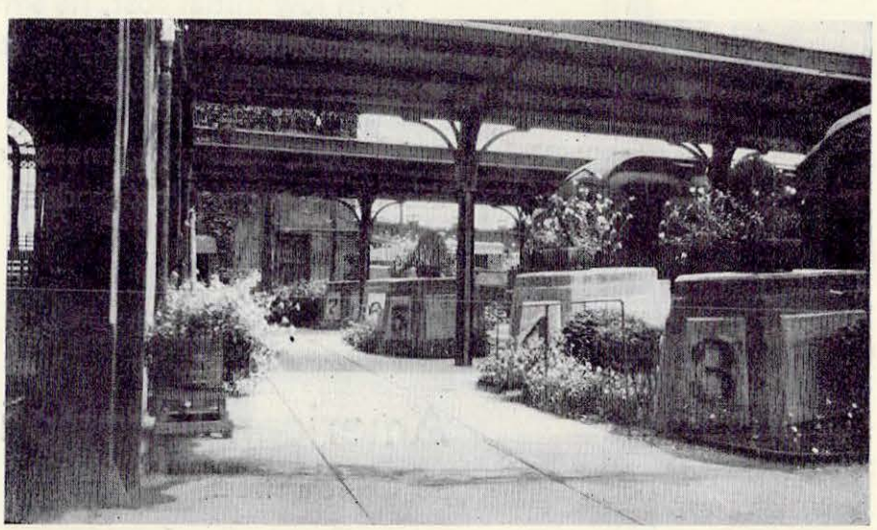

Courtesy Atlantic Coast Line News

Station End of the Train Shed of the Atlantic Coast Line Station at Wilmington, N. C., Showing Flowers and Plants Arranged Under the Direction of Station Master J. E. Clayton

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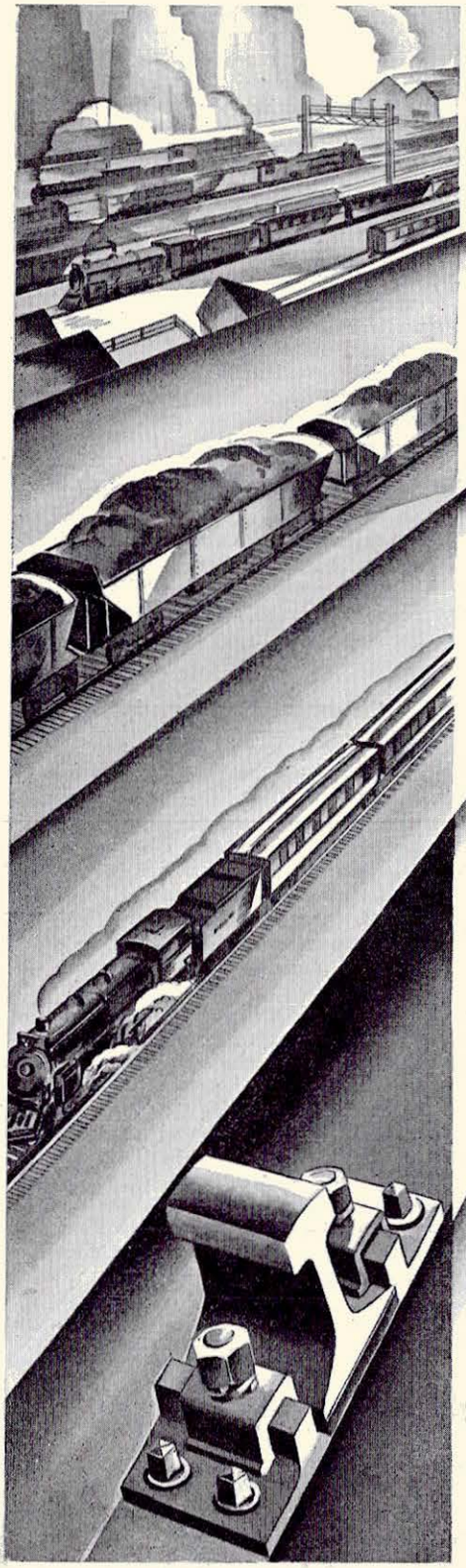

MORE TRAINS
HEAVIER TRAINS
FASTER TRAINS
demand
GEO

SMOOTH and practically noiseless track, control of rail movement, reduction in rail wave motion, longer life of rails and ties, radically reduced maintenance costs, greater safety . . . these are the important advantages of G E O—the modern track construction which is attracting the favorable attention of progressive railroad officials in search of equipment adequate to the demands of present-day traffic.

G E O is not a new, untried device. Many thousands of miles of G E O track have been laid in Europe where it has been adopted as standard construction in several countries. In Germany alone, more than 7900 miles of G E O track have been laid within the last five years. Here in America, tests on leading railroad systems are already demonstrating its outstanding merit.

Descriptive literature will be sent at your request, and Carnegie engineers are at your service at all times.

CARNEGIE STEEL COMPANY - PITTSBURGH

Subsidiary of United States Steel Corporation

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GEO TRACK CONSTRUCTION

Foreign

"Rubber-and-Rail" Travel Made Easy in Germany

To facilitate travel for automobilists who wish to make part of their tour of the country by rail, the German Railroads have extended the privilege of shipping cars on their lines at half the price of ordinary freight. The purpose of this reduction, an order of the railroad management states, is to permit "rubber-and-rail" tours in Germany at a cost not appreciably higher than that of the straight motor travel. Arrangements for the shipping of cars under the new rules are now in effect on lines between all points of importance to the motor tourist.

After having secured his railroad ticket and car-shipping permit, which entitles him to the reduced freight rate for his car, the motorist may drive his automobile on to the railroad freight car himself, or he may have the loading done for a small fee. The same applies to the unloading at the end of his car's trip. Transport charges for the automobile are figured according to the weight of the car, at half the rates for ordinary freight.

G. W. R. Completes Special Plans for Agricultural Show

In connection with the Royal Agricultural Show to be held at Warwick, England, from July 7 to 11, the Great Western of Great Britain has completed a number of special arrangements for the handling of extra traffic. A new $40,000 station, with a 700-ft. platform fully equipped for the handling of cattle, agricultural implements and other exhibits moving to and from the show, has been constructed at Cape Yard Sidings, while more than 100 specially-picked and trained G. W. R. employees have been on duty since June 1 when the first exhibits began to arrive. Between 30 and 40 tractors have been assigned to haul traffic from the station to the show grounds, and special information and ticket offices have been established on the grounds themselves.

Some idea of the traffic which these facilities may be expected to handle in connection with the show may be gained from figures for the last exhibition of its kind held on the Great Western system, at Newport, in 1927, when the G. W. R. handled:

	Inbound	Outbound
Cattle, horses, etc.	2,614	2,621
Packages, parcels, poultry, etc.	2,387	1,391
Materials and exhibits (tons)	6,183	5,929

Special arrangements for passenger traffic include cheap day tickets from any part of the system where train services permit round trips to Warwick on the same day; day and half-day excursions from important nearby points; period excursion tickets from all parts of the system, good from July 7 to 13, and reduced first and third class seven-day "season" tickets, good for any number of trips to and from Warwick during the show period.

In addition to the Royal Agricultural Show at Warwick, similar exhibitions, all involving special traffic arrangements, are to be held at 11 other points on the lines of the Great Western during the summer.

Soviet to Fine Crews of Trains Arriving Late

As one means of improving Russian railway service, the Soviet government has adopted a new system of wage payments for locomotive crews, which provides for fines for those whose trains arrive behind schedule, according to Associated Press reports from Moscow. In future, locomotive enginemen, will be paid on a mileage basis, each crew being expected to operate its locomotive 1,800 kilometers (1,125 miles) or 192 scheduled hours within a given 30-day period. If this average mileage is not attained the wages of the crew will drop accordingly, while if the stated figure is exceeded wages will increase, up to 140 per cent.

New South Wales Government Railways in 1929-30

The New South Wales (Australia) Government Railways, for the year ending June 30, 1930, reported a deficit after interest charges equivalent to $13,423,541 as compared with a 1928-29 deficit of $5,061,810 after interest and sinking fund charges. The actual gross loss was in each year greater than the above figures by $3,896,000, an offsetting item which represents the annual contribution from the government toward losses on the operation of so-called country developmental lines.

The poorer 1929-30 showing as compared with the previous year is due mainly to a decrease of $8,712,060 in gross revenue with an accompanying reduction of only $76,103 in operating expenses; net revenues were therefore down $8,635,957.

Comparative figures of financial results for the past two years are shown in the following tabulation:

	1929-30	1928-29
Gross Revenues	$86,815,990	$95,528,050
Operating Expenses	72,867,000	72,943,104
Net Revenues	$13,948,990	$22,584,946
Allowance for Developmental Line Losses	3,896,000	3,896,000
	$17,844,990	$26,480,946
Interest Charges	31,268,531	29,950,500
Sinking Fund	.....	1,592,256
Deficit	$13,423,541	$5,061,810

The report attributes the decline in revenue to the business depression which prevailed in Australia during the year under review. Passengers carried fell from 151,116,086 in 1928-29 to 147,892,548 in 1929-30; freight traffic dropped from 14,516,643 tons to 12,150,964 tons. Passenger revenues were also adversely affected by "a serious diversion from first-class to second-class train travel." The 1929-30 operating ratio of 83.93 compares with a 1928-29 figure of 76.36 and is the highest listed in the report's table of selected statistics extending back to 1855. Only two other operating ratios in this table are over 80 per cent—that of 80.98 in 1860 and that of 81.58 in 1861. In those two years only 70 and 73 miles of line respectively were operated; the 1929-30 mileage was 5,974.

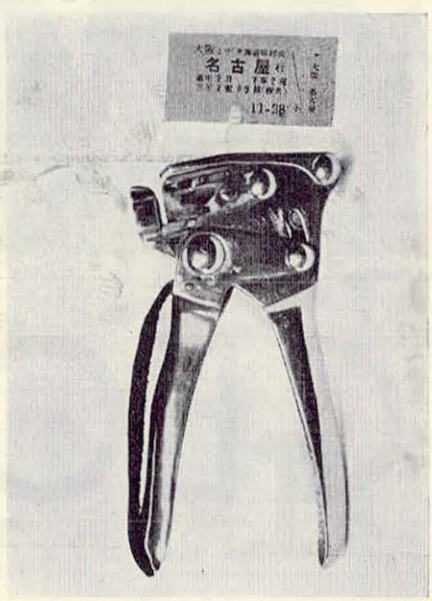
The problem of a rising deficit in connection with the operation of the so-called developmental lines is evidently a pertinent one since the report devotes considerable space to its discussion. "The railway accounts" it says "are credited with a Government contribution of £800,000 ($3,896,000) per annum for the losses on these lines; but during the period of twelve months covered by this report such losses totaled approximately £1,950,000 ($9,496,500)."

Continuing the same discussion the report lists certain developmental lines now under construction and others authorized. The anticipated annual deficit after interest charges on those developmental lines under construction is placed at $1,706,463 while, if others authorized be constructed, the anticipated annual deficit is an additional $2,287,361. Thus if the construction program be carried out and the above estimates be accurate, there will in the future be a further annual loss on developmental lines totaling $3,993,824 in addition to the aforementioned annual deficit of $9,496,500 from such lines already in service. The report characterizes these developmental lines as extensions which "have not only proved a burden on the railway accounts but have failed to bring about any material increase in production."

Printing Puncher Designed In Japan

A combination printing puncher designed to facilitate the dating of passenger tickets has been for some time in experimental use at the Tokyo station of the Japanese railways. The device, which is shown in the accompanying illustration, is described as a machine which does in one operation the three processes of printing, automatic ink-feeding and perforation.

One of the principal advantages claimed for the new printing puncher is the fact that it permits the dating of the ticket at the time the passenger begins his journey and thus aids the advance sale of tickets. Under present arrangements, because the ticket is dated at the time of its sale, the period of its validity for travel begins at that time. The printing puncher permits the actual beginning of the journey to become the beginning of the ticket's period of validity.



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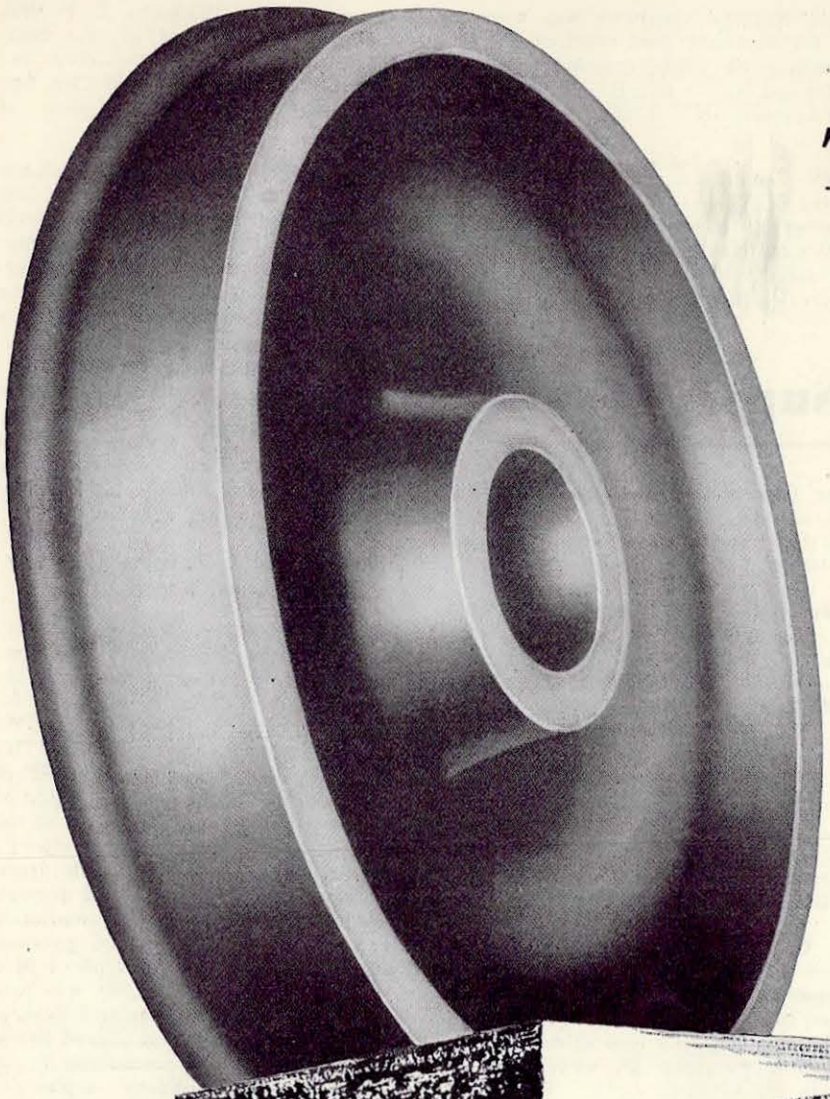

Ton Mile Drudgery

Whole populations bent their backs to the ancient problems of transportation—but today's swift transportation moves a pyramid's weight at a mile a minute pace on Gary Wrought Steel Wheels.

U S STEEL

Illinois Steel Company

Subsidiary of United States Steel Corporation

General Offices: 208 South La Salle Street, Chicago

Equipment and Supplies

LOCOMOTIVES

THE BANGOR & AROOSTOOK has ordered two eight-wheel switching locomotives from the American Locomotive Company. These locomotives will have 25 by 28 in. cylinders and a total weight in working order of 250,000 lb.

FREIGHT CARS

THE TENNESSEE COAL, IRON & RAILROAD CO. has ordered four flat cars and four sheet, bar and steel-transfer cars from the Pullman Car & Manufacturing Corp.

PASSENGER CARS

THE FERROCARRIL TERMINAL CENTRAL DE BUENOS AIRES has placed an order with the Pullman Standard Car Export Corporation for 20 all steel passenger cars for service in the subway of the Terminal company at Buenos Aires, Argentina. Negotiations for the purchase were conducted by Dr. Teofilo Lacroze, president of the Terminal Company and by I. W. McConnell, vice-president of Dwight P. Robinson & Company of Argentina, Inc., Philadelphia, Pa., who had charge of the design and construction of the new subway.

SIGNALING

THE CANADIAN PACIFIC has ordered from the Union Switch & Signal Company materials for the installation of automatic block signals on its line between Vaudreuil and Bedell, Quebec; 16 searchlight signals and other material.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered from the Union Switch & Signal Company centralized traffic control apparatus for installation at Saybrook, Conn., to control switches and signals at Westbrook, four miles west of Saybrook.

IRON & STEEL

THE DELAWARE & HUDSON has ordered 350 tons of steel for a bridge at Cobleskill, N. Y.

THE LOUISVILLE & NASHVILLE is inquiring for 2,500 tons of structural steel for a bridge at Danville, Tenn.

THE PERE MARQUETTE is inquiring for 1,000 tons of structural steel for grade separation work at Detroit, Mich.

THE ILLINOIS TERMINAL RAILROAD SYSTEM is inquiring for 1,100 tons of structural steel for a passenger and terminal warehouse at St. Louis, Mo.

THE READING COMPANY has received bids for necessary steel required for the elimination of grade crossings between Wister and Haines streets on its Germantown-Chestnut Hill branch in Pennsylvania.

THE LOUISVILLE & NASHVILLE has ordered 20,585 tons of structural steel for a bridge at Henderson, Ky., awarding 20,385 tons to the American Bridge Company and 200 tons to the Virginia Bridge & Iron Company.

Supply Trade

The Cement-Gun Construction Company has moved its New York office from the Grand Central Terminal to the Woolworth building, New York City.

David Geissinger, formerly direct factory representative in Pittsburgh, Pa., for several machine tool manufacturers, is now affiliated with the **Fort Pitt Steel Casting Company,** McKeesport, Pa., as special representative.

C. G. Carter, vice-president and treasurer of the **Liquid Carbonic Corporation,** Chicago, has been placed in charge of sales, succeeding **Carl J. Palmer,** who has resigned to become vice-president of the **Bastian-Blessing Company,** Chicago.

C. G. Bacon, director of wheel research of the **Armco Railroad Sales Company,** Middletown, Ohio, has resigned from that position but is retained by the company in a consulting capacity in connection with its wrought steel wheels.

Leslie Allen, formerly manager of the Buffalo district of **McClintic-Marshall Corporation,** has been appointed district manager of the Pittsburgh district, succeeding the late **Thomas L. Cannon. J. K. Bard** has been appointed manager of works of the Buffalo district.

The Puritan Compressed Gas Corporation, 2112 Grand avenue, Kansas City, Mo., has been appointed distributors in the state of Kansas and the western part of Missouri of the Weldite line of welding rods for the **Fusion Welding Corporation,** Chicago.

The DeVilbiss Company, Toledo, Ohio, has changed the location of its St. Louis, Mo., sales and service branch from 1903 Washington avenue to 1937 Washington avenue, and has also changed its New York sales and service branch from 25 West Forty-third street to 25 West Forty-fifth street.

The Wilson Engineering Corporation has been organized, with headquarters at 122 South Michigan avenue, Chicago, to manufacture, engineer and market the mechanical equipment and devices heretofore handled by the **Bird-Archer Company.** The officers of the new company include: President, **L. F. Wilson,** formerly president of the Bird-Archer Company, and treasurer and mechanical engineer, **V. E. McCoy,** formerly assistant to the president of Bird-Archer.

The J. G. Brill Company, Philadelphia, Pa., has announced the closing on July 1 of its plant at St. Louis, Mo., formerly known as the American Car Company. In closing this plant the Brill management is following the trend toward the elimination of uneconomical operation by concentrating its manufacturing activities for electric railways in the west and middle west, at the plant of The J. G. Brill Company of Ohio, in Cleveland. The J. G. Brill Company's western region will continue sales representation in St. Louis, with **R. S. Hood** at 1558 So. Vandeventer avenue.

American Car & Foundry Company Annual Report

With its business in the making and repairing of railroad equipment "less than at any time in its prior history," the American Car & Foundry Company for the fiscal year ending April 30, 1931, reported net earnings of $1,406,347. This amount, which compares with the 1929-30 net of $5,363,765, fell short by $693,653 of the total required for the payment of the full 7 per cent dividend on the company's outstanding preferred stock. The deficiency in the preferred dividend requirements was made up by an appropriation from consolidated surplus of previous years while a common dividend of $4 a share, amounting to $2,400,000, was paid out of the previously-accumulated Reserve for Dividends on Common Capital Stock.

The statements of consolidated net earnings and of consolidated surplus for the year ended April 30, 1931, follow:

STATEMENT OF CONSOLIDATED NET EARNINGS

Earnings from all sources for the thirty-second fiscal year ended April 30, 1931—before deducting Repairs, Renewals, etc., as noted hereunder—and after making provision for Federal Taxes ($132,057.10)	$3,026,789
Less: Renewals, Replacements, Repairs, New Patterns, Flasks, etc.	1,620,442
Net Earnings	$1,406,347

STATEMENT OF CONSOLIDATED SURPLUS

Consolidated Surplus, April 30, 1930		$40,138,674
Add: Net Earnings for the year		1,406,347
		41,545,021
Less: Dividends		
On Preferred Capital Stock, 7%	$2,100,000	
On Common Capital Stock	2,400,000	
	4,500,000	
Less: Common Stock Dividends paid from Reserve applicable for that purpose	2,400,000	2,100,000
Consolidated Surplus, April 30, 1931		$39,445,021

President W. H. Woodin in his remarks to the stockholders said in part as follows:

The year just ended witnessed no recovery from the conditions of world-wide gloom and depression, with results not confined to any one line of industry but common to practically all, that prevailed at the close of the preceding fiscal period. These conditions, in this country at least, affected in an intensive degree the particular field of in-

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ROLL UP THE MILEAGE *with* GOOD BOILER TUBES

Maximum mileage and maximum regularity in proportion to operating costs—that is transportation economy.

Top-notch, unvarying performance of the engine is even more important than economy of boiler maintenance. The two are likely to go together, of course, and NATIONAL-SHELBY Seamless Boiler Tubes go very far to assure both. For the same qualities that make them lasting, make them also highly immune to costly disablements, interruptions, and delays.

Ductility, toughness, and strength are worked into these tubes by employment of the expertness, the facilities, and the organization of the largest manufacturer of tubular products in the world. They resist pitting and fatigue, hold tight in the flue sheet, and give lasting, efficient service. Ask for Bulletin 12, describing NATIONAL-SHELBY—

America's Standard Boiler Tubes

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

US STEEL

NATIONAL SEAMLESS

dustry in which your Company is chiefly engaged,—the manufacture and sale of railroad equipment and rolling stock. Never before in its history has your Company had to contend with like conditions—and to judge from current reports, the same is true with respect to by far the major portion of the industries of our country. . . .

At this writing there seem to be some evidences, slight though they may be, of emergence from the despondency of the past months. The wise and statesman-like pronouncement which has just come from Washington inviting the deferring for a definite period of all demands for the payment of both the principal and the interest of inter-governmental debts, including those for "war reparations," should relieve the financial tension under which our neighbors of Europe have been laboring and which, if unrelieved, surely will lead to a state approaching international chaos—the outcome of which no man can foresee. It is heartening to note that the Administration has not come to this momentous decision without first having secured what seem to be adequate assurances of Congressional support—so it is reasonable to assume that the first great step forward in the curing of the world's economic ills has been taken.

The general acquiescence in the request of the railroads of our country for an increase in freight rates and the announced intention of the Interstate Commerce Commission to expedite its decision of the question, are of hopeful significance. That this request will be opposed by some industries goes without saying, but it is to be hoped that the purely selfish interests of a few will not be allowed to over-bear the great and real necessity of the roads for such increase of revenue as will not only restore and sustain public confidence in the value of their securities, but also will permit the substitution of needed modern facilities of transportation, both rolling stock and motive power, for much equipment now in use and the purchase of the additional equipment that undoubtedly will be required upon the return of normal business conditions.

OBITUARY

William N. Thornburgh, president of William N. Thornburgh Company, Chicago, died on June 18 from heart failure.

Walter E. Coffin, mechanical engineer, National Malleable & Steel Castings Company, Cleveland, Ohio, died on June 25.

Arthur Lathom Church, mechanical engineer, secretary and assistant treasurer of the Baldwin Locomotive Works, Philadelphia, Pa., died of heart disease on June 25 at the Pennsylvania Hospital, Philadelphia, Pa.

William Lawrence Saunders, chairman of the board of directors of the Ingersoll-Rand Company, New York, died on June 25, at Teneriffe, Canary Islands. Mr. Saunders was born on November 1, 1856 at Columbus, Ga. He was graduated from the University of Pennsylvania in 1876 with the degree of B. S. and in 1911 was given the degree of Sc. D. by the same university. He took up newspaper work in 1876 and from 1878 to 1882 was engineer in charge of dock construction at Black Tom Island, New York harbor. He designed and patented apparatus for subaqueous drilling, using tube and water jet systems now in general use; in 1882 he was appointed engineer for the Ingersoll Rock Drill Company and later invented many other devices. Mr. Saunders subsequently served as secretary, vice-president and director of the Ingersoll-Sergeant Drill Company; president and director of the Rand Drill Company and then as president of the successor company, the Ingersoll-Rand Company, until his election as chairman of the board of the same company of which he was also a director. Mr. Saunders' activities, in addition to serving as a director or executive of a number of industrial compaines, included that of governor, director and deputy chairman of the board of the Federal Reserve Bank of New York and during the war as a member of the district commission on capital issues of the Federal Reserve Board; on the advisory board of the Fuel Administration and the Military Engineering Committee. He had served as a member of the New Jersey Harbor Commission, member of the New Jersey Board of

William Lawrence Saunders

Commerce and Navigation, of the Naval Consulting Board of the United States, and of the advisory committee of the Federal Trade Commission. He was also a member of a large number of technical and other associations. He is the author of books on Compressed Air Information; Compressed Air Production, and co-author of the Subways and Tunnels of New York; Rock Drilling, and numerous other pamphlets and articles in engineering and other journals. In addition he took an interest in civic affairs having served as mayor of North Plainfield, N. J. He was also interested in national political affairs.

A COMPLETE STOCK-TAKING OF TRANSPORTATION IN CANADA—rail, water, truck and bus—is contemplated in a suggestion made last week at Ottawa by Sir Henry Thornton, president of the Canadian National, to the House Committee on National Railways and Shipping, who urged the appointment of a Royal Commission to inquire into every aspect of the problems of transportation. His suggestion met with the warm commendation of most members of the committee, including two men formerly rather critical of him, Richard B. Hanson, from New Brunswick, and Dr. Peter McGibbon, from Ontario, and both Conservatives. These two described his plan as a "very constructive suggestion." This week the committee will present its final report to the House and what it recommends in connection with Sir Henry's suggestion is awaited with wide interest.

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of a fill for the elevation of this company's tracks for about 2.5 miles through Oklahoma City, Okla., has been let to Leo Sanders, Oklahoma City. This fill will extend from Southwest Twenty-first to Northwest Eighth streets. Bids were closed on June 23 for the construction of a concrete and brick engine house at Boise City, Okla. It will include six locomotive stalls, boiler room and concrete inspection pits.

CHICAGO, BURLINGTON & QUINCY—WABASH.—The Iowa state highway commission has awarded a contract to Ben Cole & Son, Ames, Iowa, for the construction of a viaduct to carry road No. 2 over the tracks of these railroads near Tracy, Iowa.

CHICAGO, ROCK ISLAND & PACIFIC—ST. LOUIS-SAN FRANCISCO.—A contract has been awarded to the John W. Fox Construction Company, El Reno, Okla., for the construction of a reinforced concrete highway subway under the tracks of these companies at South Robinson avenue, Oklahoma City, Okla.

KANSAS CITY SOUTHERN.—A contract has been awarded to the M. A. Long Construction Company, Baltimore, Md., for the construction, at a cost of approximately $120,000, of a 600,000-bu. addition to the grain elevator owned by this railroad and leased to the Moore-Seaver Grain Company, in the Northeast Industrial district at Kansas City, Mo.

LONG ISLAND.—The Public Service Commission of New York has ordered the separation of the grades of this company's tracks and the Quogue-Riverhead county highway, in the village of Quogue, Southampton, N. Y., by carrying the highway under the railway tracks, at an estimated cost of $103,000.

LOUISVILLE & NASHVILLE.—This railroad and the Tennessee state highway department contemplate the construction of a reinforced concrete viaduct over the railroad's tracks at East Wood street, Paris, Tenn. The cost, which has not yet been determined, will be borne by the state and the railroad.

NEW YORK CENTRAL.—The New York Public Service Commission has ordered the reconstruction of the bridge carrying State street, Corning, N. Y., over the tracks of this railroad.

SOUTHERN PACIFIC.—The Interstate Commerce Commission is holding open the record for 60 days in the application of the Houston & Texas Central for authority to construct an extension from a point near Hockley, Tex., southerly 4.3 miles to permit the applicant to negotiate with the Warren Central Railroad for the acquisition or use of a portion of its line in lieu of the construction of the proposed branch line.

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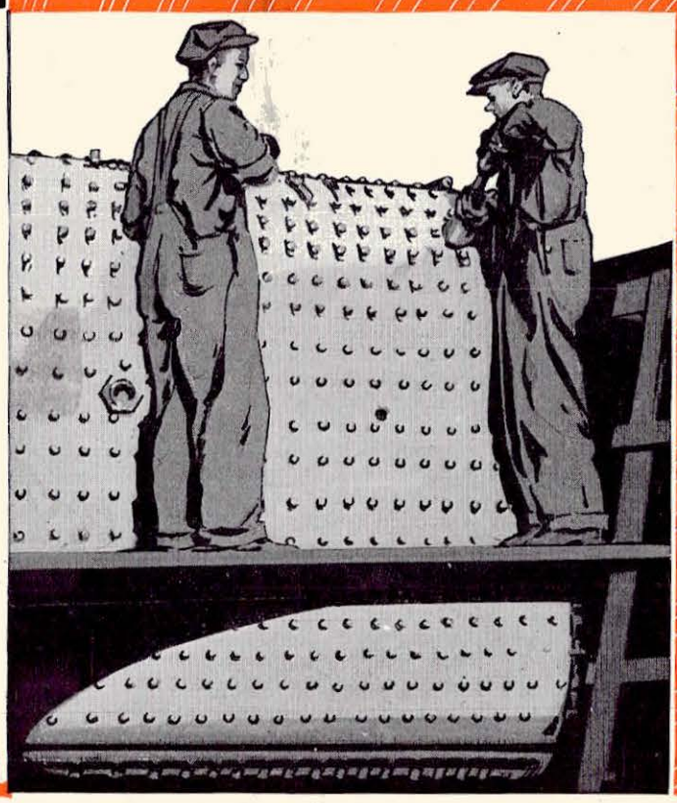
TONCAN
COPPER
Mo-lyb-den-um
IRON



AGATHON
NICKEL
IRON

modern

Locomotives Ask A Lot From Staybolts

Up go boiler pressures! Fireboxes increase tremendously in size. Staybolts are stressed more and more. • These new responsibilities have focused attention on the staybolt. • Where greater toughness is essential, railroads are specifying staybolts of Agathon Nickel Iron. Without sacrifice of the desired fatigue resistance these staybolts are substantially stronger than ordinary staybolts. • But where iron staybolts are still preferred, Toncan Iron offers several advantages as a staybolt material. It is uniform in composition and due to the alloying of refined iron, copper and molybdenum, possesses a superior resistance to corrosion. Toncan Iron is the modern staybolt iron.

CENTRAL ALLOY DIVISION
REPUBLIC STEEL
CORPORATION
Massillon, Ohio

Financial

ATCHISON, TOPEKA & SANTA FE.—*Trackage Rights.*—This company and the Elkhart & Santa Fe have applied to the Interstate Commerce Commission for authority to extend their operations over a line of the Colorado & Southern from Clayton, N. M., to Mt. Dora, which will avoid the necessity for the construction of 17 miles of line.

BALTIMORE & OHIO.—*Alton Acquisition Case Submitted to I.C.C.*—Oral argument was heard by the Interstate Commerce Commission on June 29 on this company's application for authority to acquire control of the properties of the Chicago & Alton, which was opposed by counsel for a stockholders' protective committee. The argument for the B. & O. was presented by Luther M. Walter and H. W. Anderson, who told the commission that approval of the application represents the only available way in sight for getting the Alton out of receivership and giving it a new start with a conservative capitalization and opportunities for some economies by operation as part of the B. & O. system. Jonathan C. Gibson, of counsel for the stockholders, contended that the physical value of the property is over $125,000,000 and that this, in connection with the opportunities for economies, represents a large equity for the stockholders. Mr. Anderson said, however, that under the court decree there is an indebtedness of $122,000,000 against the property ahead of the stock; that the time for appeal from the decree has expired, and that there is no other bidder in sight for the property if the commission should decline to approve the B. & O. application. When he referred to the claims of the stockholders as "fantastic," Commissioner Eastman asked if they were any more so than some that had been recognized in other railroad reorganizations. Mr. Anderson said they were not but that the Alton was overcapitalized at the last reorganization and that the B. & O. is trying to put it on a sound financial basis with a conservative capitalization and that if the commission should do what the stockholders want the former condition would be perpetuated.

BOYNE CITY, GAYLORD & ALPENA.—*Commercial Value.*—Examiner J. V. Walsh of the Interstate Commerce Commission in a proposed report has recommended that the commission find the "commercial value" of this company's property to be $345,000, setting aside the finding of a majority of three arbitrators, who had found the value to be $1,392,293, based largely on the commission's finding of a value for rate-making purposes of $1,706,500, as of 1918, based on cost of reproduction at 1910-1914 prices. The examiner also recommends that the New York Central be required to offer $345,000 for the property in compliance with the conditions imposed by the commission when it authorized the lease of the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis. The New York Central, which had taken the position that the property had only a "negative" value and had offered $1 for it, had objected to the finding of the arbitrators as excessive and the examiner finds that it is "materially in excess of the value of the property as of the present time." He pointed out that on June 15, 1928, the stockholders had authorized the directors to offer to sell the property to the New York Central for $1,077,247 and that the business has been conducted since that time "with increasing deficits and shrinking assets." The value sought, he said, is the value as of the time of transfer, if for no other reason than that the Alpena is not bound to accept any offer made by the Central, and "in so far as the record shows, whatever disposition of the property were made by the present owners it could not be made to yield, under independent operations, a profitable return on an amount materially in excess of $300,000." The arbitrators had indicated that they were viewing the acquisition of the Alpena by the Central as "a sale and purchase of materials and labor rather than of earning capacity."

CENTRAL OF NEW JERSEY.—*Omits Extra Dividend.*—The directors of this company in declaring the regular quarterly dividend of $2, omitted the usual extra semi-annual dividend of like amount customarily declared at this time.

CHICAGO & NORTH WESTERN.—*Bonds.*—This company had applied to the Interstate Commerce Commission for authority to issue and pledge $3,000,000 of 4½ per cent general mortgage bonds as collateral for a note for $2,000,000 for three months to the First National Bank of Boston at 3½ per cent

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $467,000 of first and general mortgage 6 per cent bonds, to be pledged as collateral for short term notes.

CHICAGO, ROCK ISLAND & PACIFIC.—*Bonds.*—The Interstate Commerce Commission has authorized this company to pledge and repledge until June 30, 1933, $8,497,000 of its first and refunding mortgage bonds and $6,540,000 of St. Paul & Kansas City Short Line first mortgage bonds as collateral security for notes.

CHICAGO, SPRINGFIELD & ST. LOUIS.—*Sale.*—Stockholders of the Chicago, Springfield & St. Louis purchased the railway at public auction at Springfield, Ill., on June 25 for $200,000, the minimum price set by Federal Judge Louis Fitz-Henry. J. E. Howden and Chester W. Bottome, New York, representing the stockholders, made the only bid.

ELKIN & ALLEGHANY.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon the operation of its line, from Elkin, N. C., to Vaneer, 15.2 miles.

KENTUCKY & INDIANA TERMINAL.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $500,000 of first mortgage 4½ per cent bonds, to be pledged as collateral for short-term notes.

LONG ISLAND.—*Abandonment.*—The Interstate Commerce Commission has issued a supplemental report and order making effective 120 days from June 17 its order which had authorized this company to abandon its Whitestone branch, in Queens county, N. Y., on condition that the company, if it may lawfully do so, should establish bus and truck service as a substitute. On May 13 the Long Island asked to be relieved of the obligation of further efforts to obtain the co-operation of the New York Transit Commission and the city of New York, saying it had been unable to obtain action on its application for a bus franchise. The report said that it was manifest that the city, which had vigorously opposed the application for authority to abandon the line, is not disposed to accord that measure of co-operation which the federal commission had anticipated since seven months had elapsed since the company first approached the city with a request for a conference and more than five months since it filed application for a franchise. Commissioners Aitchison, Eastman, McManamy and Lee dissented.

NEW YORK, NEW HAVEN & HARTFORD.—*Equipment Trust.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability for $2,595,000 of its 4½ per cent equipment trust of 1931 certificates, maturing from 1932 to 1946. The issue is authorized for sale to Salomon Bros. & Hutzler and the First National Bank of New York at 102.62, making the average annual cost to the railroad approximately 4.096 per cent.

PENNSYLVANIA.—*Use of Station Facilities by Long Island.*—Examiner M. S. Jameson of the Interstate Commerce Commission has recommended in a proposed report that the commission deny the application of the Pennsylvania and the Long Island for approval of a modified contract governing the rental to be paid by the Long Island for the use of Pennsylvania terminal facilities in New York City, without prejudice to the submission of a new contract which meets the objections cited. Under the proposed contract, dated December 23, 1930, after the commission had declined to approve an earlier contract, the Long Island payments for 1930 would have been increased from $2,918,197 to $3,930,225. A major part of the increase of about $1,000,000, the examiner said, is brought about under the new proposal by a change in the interest rate on the property used from 4 and 4.5 per cent to a uniform rate of 5.75 per cent, based on the commission's finding that that rate would be a fair return on railroad property, and by the charging of 20 per cent of the operating expenses of the station to the Long Island. In this case, he said, special circumstances exist, notably the fact that the Pennsylvania pays but 5 per cent on $50,000,000 of capital stock of the Pennsylvania Tunnel & Terminal Company and 4.5 per cent on $58,600,577 of its bonds, and he recommended a finding that a uniform rate of 5

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BETTER FIRES

FIREBAR CORPORATION
CLEVELAND OHIO.

per cent would be reasonable. He also objected to a clause in the proposed contract providing for a readjustment for each five years. This, he said, would carry with it, if approved, authority for the parties, that are closely affiliated, to modify some of the basic terms without submitting the new terms to the commission for approval.

PITTSBURGH & WEST VIRGINIA.—*Dividend Deferred.*—The directors of this company have deferred action on the quarterly dividend of $1.50. The stock had been on a regular $6 annual basis since the declaration of its initial dividend in April, 1926.

SEABOARD AIR LINE.—*Abandonment.*—The receivers have applied to the Interstate Commerce Commission for authority to abandon a branch line from Cedar Key, Fla., to Archer, 41.5 miles, stating that it has been paralleled by a hard-surfaced highway and that its traffic has been so reduced as to render the operation unprofitable.

WESTERN MARYLAND.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $3,341,000 of first and refunding mortgage 5½ per cent, Series AA bonds, and $1,659,000 of first and refunding mortgage 5 per cent, Series A, bonds, to be pledged and repledged as collateral security for notes.

Dividends Declared

Atchison, Topeka & Santa Fe.—Common, $2.50, quarterly, payable September 1 to holders of record July 31.

Delaware, Lackawanna & Western.—$1.00, quarterly, payable July 20 to holders of record July 6.

International Railways of Central America.—Preferred, 1¼ per cent, quarterly, payable August 15 to holders of record July 31.

Norfolk & Western.—Common, 2½ per cent, quarterly, payable September 19 to holders of record August 31; Adjustment Preferred, 1 per cent, quarterly, payable August 19 to holders of record July 31.

Northern Pacific.—1¼ per cent, quarterly, payable August 1 to holders of record July 6.

Pittsburgh & West Virginia.—Common dividend action deferred.

Reading Company.—Common, $1, quarterly, payable August 13 to holders of record July 16; First Preferred, 50c, quarterly, payable September 10 to holders of record August 20; Second Preferred, 50c, quarterly, payable October 8 to holders of record September 17.

Average Prices of Stocks and of Bonds

	June 30	Last week	Last year
Average price of 20 representative railway stocks..	72.92	70.13	112.40
Average price of 20 representative railway bonds..	91.22	91.23	93.65

CLASS I RAILROADS in the first five months of 1931 placed 6,448 new freight cars in service, according to the Car Service Division of the American Railway Association. The same period last year showed 42,122. Of the new cars, 2,849 were box cars, 2,787 were coal cars, 262 flat, 542 refrigerator and 8 miscellaneous cars. The railroads on June 1 had 7,617 new freight cars on order, compared with 30,680 on the same day last year. The railroads also placed in service in the five months 71 new locomotives, compared with 339 in the same period in 1930. New locomotives on order on June 1 totaled 51 compared with 431 on the same day last year.

Railway Officers

EXECUTIVE

R. W. Brown, general manager of the Central of New Jersey, with headquarters at Jersey City, N. J., has been elected a vice-president of the company, effective July 1, with the title of vice-president and general manager.

Henry D. Pollard, whose election to the presidency of the Central of Georgia, succeeding **A. E. Clift,** was announced in the *Railway Age* of June 27, has also been elected president of the Wrightsville & Tennille, the Wadley Southern, the Louisville & Wadley, the Sylvania Central and the Short Lines Motor Transport Company, with headquarters at Savannah, Ga.

Frank W. Grace, who has been elected vice-president and general manager of the Missouri-Kansas-Texas Lines, with headquarters at Dallas, Tex., has been engaged in railway service for almost 37 years, all of which has been on the Katy. He was born on February 10, 1880, at Denison, Tex., and 14 years later he obtained his first railroad experience as a call boy. For the following 25 years he served successively in that position, and as station helper,

Frank W. Grace

seal clerk, brakeman, yardmaster and trainmaster. In 1919, Mr. Grace was promoted to division superintendent at Wichita Falls, Tex., where he remained until 1923, when he was transferred to Muskogee, Okla. He was advanced to general superintendent of the Katy, with headquarters at Denison, on February 1, 1927, and on July 1, 1930, he was promoted to general manager, with headquarters at Dallas. Mr. Grace's appointment as vice-president and general manager became effective on June 22.

FINANCIAL, LEGAL AND ACCOUNTING

D. H. Crenshaw has been appointed assistant freight claim agent of the Atlantic Coast Line, with headquarters at Wilmington, N. C.

G. N. Reilly has been appointed general claim agent of the Chicago Great Western, with headquarters at Chicago. **V. E. Vaughn** has been appointed examiner of joint facilities, with headquarters at Chicago.

OPERATING

The Ottawa and Smiths Falls divisions of the Canadian Pacific have been combined and will henceforth be known as the Smiths Falls division, effective July 1. **A. Williams** has been appointed superintendent of the new division, with headquarters at Smiths Falls.

The office of superintendent of telegraph and signals of the Chicago Great Western has been abolished and **G. O. Perkins,** who held that position, has been appointed superintendent of telephone and telegraph lines, with headquarters at Chicago, **T. H. Kearton,** general signal inspector at Chicago, has been promoted to superintendent of signals, with the same headquarters.

S. V. Rowland, superintendent of the Illinois division of the Chicago Great Western, with headquarters at Oelwein, Iowa, has been appointed superintendent of the Illinois-Iowa division, which includes the former Iowa division. **E. W. Fowler** superintendent of the Iowa division, with headquarters at Des Moines, Iowa, has been transferred to the Minnesota division, with headquarters at St. Paul, Minn., succeeding **C. J. Kavanagh,** who has been assigned to other duties.

The jurisdiction of **L. L. Morton,** superintendent of the New Orleans & Mobile division of the Louisvalle & Nashville, with headquarters at Mobile, Ala., was extended on July 1 to include the Montgomery division. The Owensboro division has been discontinued as a separate operating unit and that part of it between Strawberry and Henderson, Ky., and between Irvington and Atkinson, Ky., have been added to the Evansville division. The portion between Owensboro and Adairville, Ky., has been added to the Memphis division.

Clarence E. Weaver, chief engineer of the Central of Georgia, with headquarters at Savannah, Ga., has been appointed assistant general manager and chief engineer, a newly created position, with the same headquarters. Mr. Weaver was born in Newark, N. J., on January 7, 1877, and was educated at Woodstock Academy (Woodstock, Conn.), and the Sheffield Scientific School of Yale University, where he received a Ph. B. degree in 1899. He entered railroad service in the same year as assist-

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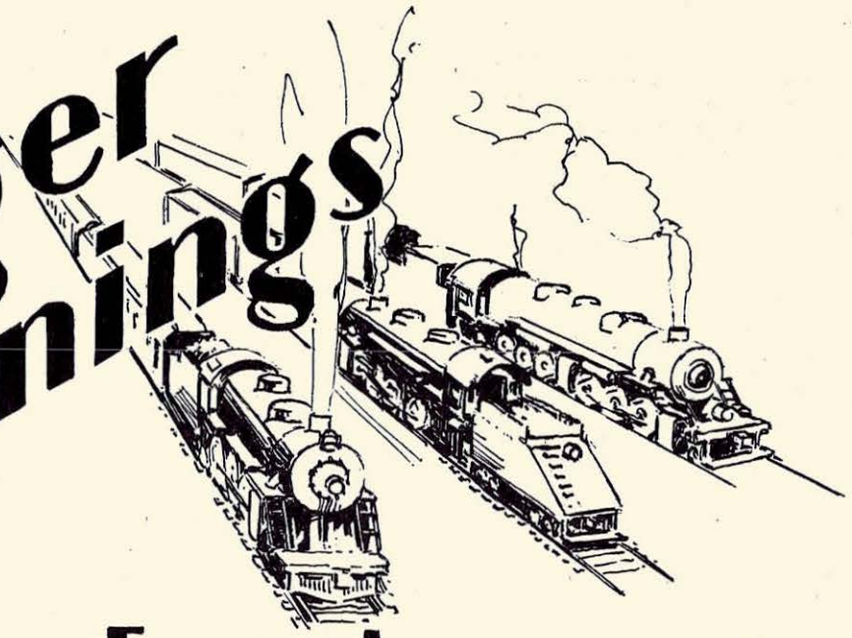
Bigger Earnings



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ant engineer on the Mexican International (now part of the National of Mexico), in which capacity he served until 1906, when he became resident engineer for the Sonora Railway (now part of the Southern Pacific of Mexico). He was also appointed resident engineer of the Cananea, Yaqui River & Pacific (now part of the S. P. of Mexico), in 1908, and the following year he became engineer, maintenance of way, of the Sonora Railway and the Southern Pacific of Mexico. From March to June, 1911, Mr. Weaver was resident engineer on construction for the Illinois Central, then becoming roadmaster for the same road, in which capacity he served until 1913. On the latter date he was appointed district engineer on the southern lines of that company. He was appointed engineer, maintenance of way, on the Central of Georgia in 1916, and in 1926 was promoted to chief engineer of the road, which position he will continue to hold, in addition to that of assistant general manager.

Clarence E. Weaver

TRAFFIC

C. F. Keller has been appointed general freight agent of the Lehigh & New England at Bethlehem, Pa., succeeding **F. W. D. Goddard,** resigned.

J. C. McNeal has been appointed general agent for the Chesapeake & Ohio at Lexington, Ky., succeeding **Andrew Mitchell, Jr.,** deceased.

J. V. Laffan has been appointed assistant general freight agent of the New York Central, lines Buffalo and East, with headquarters in New York City.

F. K. Prosser has been appointed manager, coal department, of the Norfolk & Western, with headquarters at Roanoke, Va., and **J. B. Giltner** has been appointed assistant manager, coal department, with headquarters at the same point.

The jurisdiction of **E. J. Leenhouts,** agricultural agent of the New York Central, lines west of Buffalo, has been extended to include the New York Central Railroad, Buffalo and East, with headquarters at Rochester, N. Y.

George F. Weston, special representative for the Erie with headquarters in New York, has been appointed industrial commissioner, effective July 1, to succeed **C. E. Ward,** deceased. Mr. Weston will also continue to act as special representative.

E. T. Reynolds, general freight agent of the Pere Marquette, with headquarters at Detroit, Mich., has been appointed assistant freight traffic manager, with the same headquarters. **F. W. Goldie,** assistant general freight agent, has been appointed assistant freight traffic manager, with headquarters as before as Chicago. **J. C. Harms,** assistant general freight agent, has been appointed general freight agent, with headquarters as before at Detroit, Mich. **E. M. Potticary,** chief of the tariff bureau at Detroit, has been appointed assistant general freight agent at the same point, and **E. L. Thrall** has been appointed chief of the tariff bureau to succeed him. **J. A. Hewitt** has been appointed assistant general freight agent, with headquarters at Chicago, and **C. H. Jens** and **H. F. Walter** have been appointed general agents, with headquarters at Milwaukee, Wis., and Minneapolis, Minn., respectively.

ENGINEERING AND SIGNALING

S. R. Young, assistant chief engineer of the Atlanta & West Point has been appointed chief engineer of that road, the Western Railway of Alabama and the Georgia Railroad, with headquarters as before at Atlanta Ga. Mr. Young succeeds **O. T. Nelson,** deceased.

Warren Y. Scott, signal engineer of the Boston & Maine, has been appointed consulting signal engineer, with headquarters as before at Boston, Mass. **Joseph P. Muller,** signal construction engineer at Boston, has been appointed signal engineer, with the same headquarters.

J. R. Caswell, division engineer of the Canadian Pacific at Smiths Falls, Ont., has been appointed division engineer, Montreal terminals, with headquarters at Montreal, Que., succeeding **J. A. MacKenzie,** transferred. **W. W. Benny,** formerly division engineer at Ottawa, will replace Mr. Caswell as division engineer at Smiths Falls.

MECHANICAL

R. V. Carleton, division master mechanic of the Canadian Pacific at Ottawa, Ont., has been transferred in the same capacity to the Laurentian division, with headquarters at Montreal, Que., succeeding **R. Walton,** transferred.

Alexander McPhee has been appointed master mechanic of the Rocky Mountain division of the Northern Pacific at Missoula, Mont., succeeding **John A. Marshall,** who has been transferred to the Seattle division at Seattle, Wash., to succeed **D. S. Littlehales,** retired.

The jurisdiction of **W. H. Flynn,** general superintendent of motive power and rolling stock on the New York Central, with headquarters at New York, has been extended to include the Harmon shop and forces engaged in maintaining electric and Diesel locomotives and multiple unit cars.

H. W. Brewer, superintendent of shops on the Buffalo, Rochester & Pittsburgh at Du Bois, Pa., has been appointed general master mechanic in charge of motive power and equipment at the same point. The position of superintendent of motive power, which was formerly held by **E. V. Williams,** deceased, has been abolished.

MOTOR TRANSPORT

In addition to his present duties with the Pacific Greyhound Lines, Inc., **R. M. Ahrens** has also been appointed general superintendent of maintenance and equipment.

Art Stewart has been appointed manager, department of tours, of the Pacific Greyhound Lines, Inc., and the California Parlor Car Tours Company, with headquarters at San Francisco, Cal., succeeding **George J. Loftus,** who has been transferred.

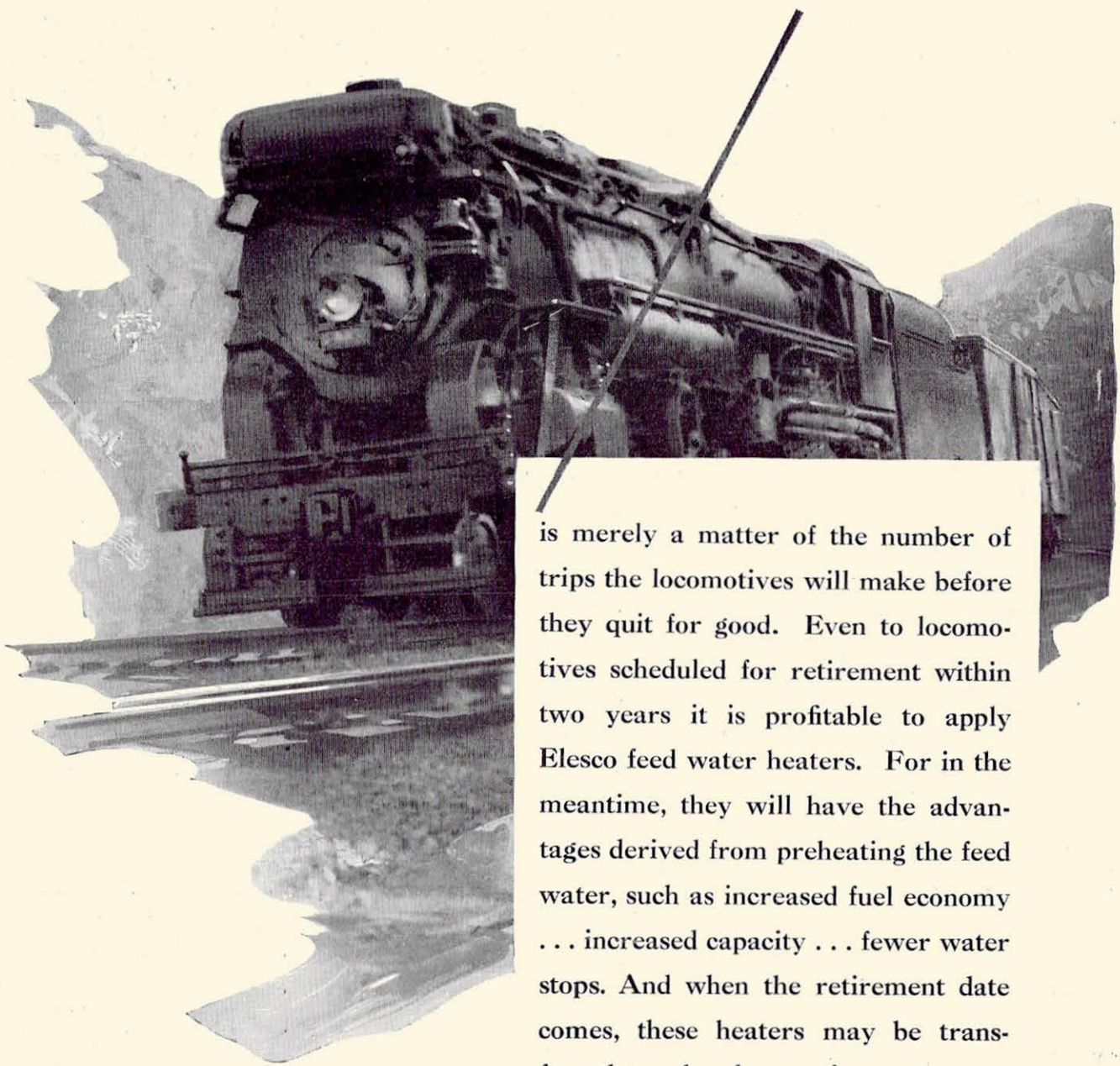
E. A. Hadfield has been appointed assistant general manager of the Pacific Greyhound Lines, Inc., with headquarters at Portland, Ore. He will have jurisdiction over the territory from Portland to Medford, Ore., via the Pacific highway, and to but not including Crescent City, Cal., via the Oregon Coast highway, and all local service within the State of Oregon.

OBITUARY

Samuel A. Hering, superintendent of car service of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., died at St. Vincent hospital in that city on June 30, following a heart attack. Mr. Hering, who was 64 years of age, had been in the service of the Union Pacific System since 1884.

Otto Mears, who was president of the Silverton, the Silverton Northern and the Rio Grande Southern, with headquarters at Denver, Colo., and Silverton, for varying periods from 1888 to 1930, died at Pasadena, Cal., on June 24 at the age of 91 years. Mr. Mears, who was born in Russia, had been a resident of Colorado for more than 65 years.

WHETHER ELESCO FEED WATER HEATERS WILL PAY OR NOT...



is merely a matter of the number of trips the locomotives will make before they quit for good. Even to locomotives scheduled for retirement within two years it is profitable to apply Elesco feed water heaters. For in the meantime, they will have the advantages derived from preheating the feed water, such as increased fuel economy . . . increased capacity . . . fewer water stops. And when the retirement date comes, these heaters may be transferred to other locomotives.

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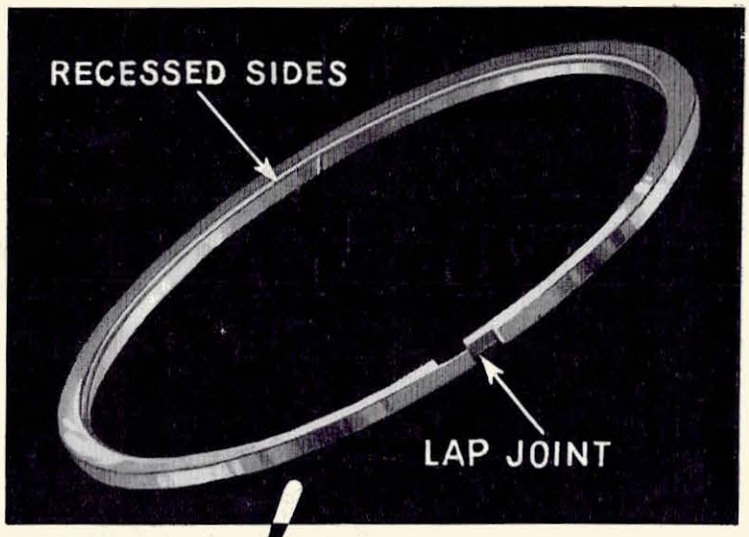

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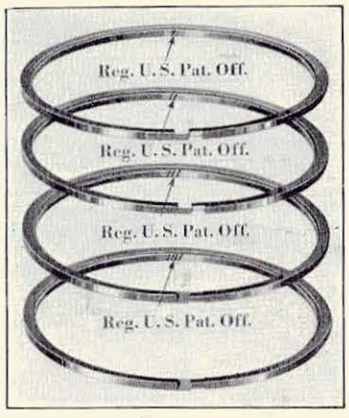
The lap-joint is made by distinctive means and methods—the ***recessed feature*** is patented.



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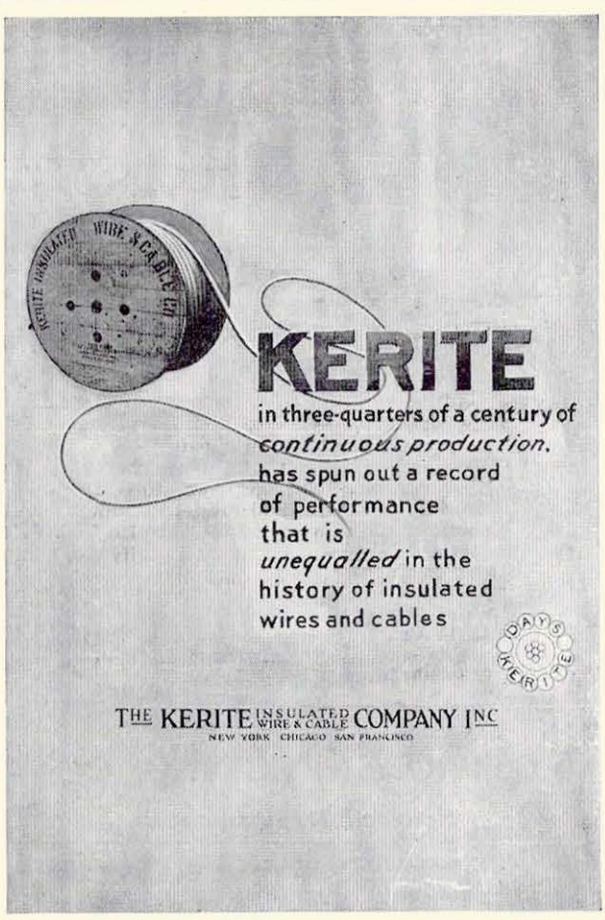

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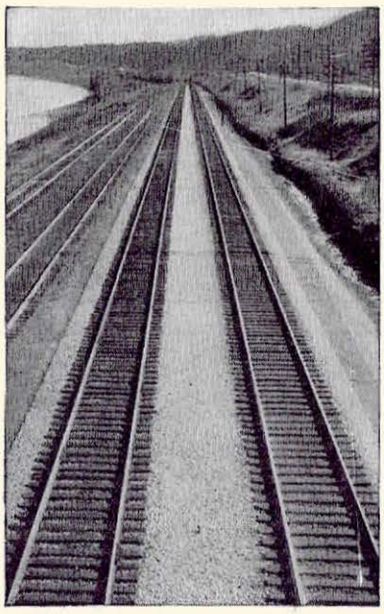

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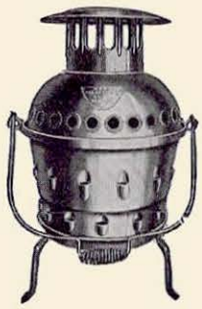

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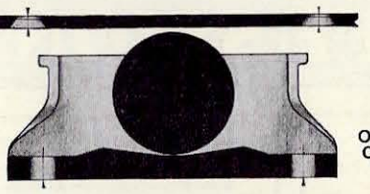

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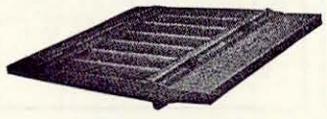
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American Creosoting Co.
Century Wood Preserving Co.
International Creosoting & Constr. Co.
National Lumber & Creosoting Co.

Creosote, Wood Preservative Treatment.
Century Wood Preserving Co.
National Lumber & Creosoting Co.

Cribbing Units.
Federal American Cement Tile Co.

Cross Arms, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
Graybar Electric Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cross Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cross Ties, Steel.
Bethlehem Steel Co.

Crossheads & Shoes.
Baldwin Locomotive Wks.
Barco Mfg. Co.
International Creosoting & Construction Co.

Crossing Signals & Signs.
Railroad Supply Co.

Crossings—(See Frogs and Crossings).

Crossings, Pavement.
Carey Co., The Philip.

Crushers, Coal.
American Sheet & Tin Plate Co.
Orton Crane & Shovel Co.

Culverts.
Armco Culvert Mfrs. Assoc.
Republic Steel Corp.
Toncan Culvert Manufacturers' Association.

Culverts, Corrugated Iron
Armco Culvert Manufacturers' Association.
Republic Steel Corp.

Culverts, Part Circle
Armco Culvert Manufacturers Association

Culverts, Treated.
Century Wood Preserving Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Cups, Oil.
Hammett, H. G.
New York Air Brake Co.
Prime Manufacturing Co., The.
Westinghouse Air Brake Co.

Curtains & Fixtures, Car Window.
Pantasote Co., Inc., The.

Curtain Material, Car.
Ryerson & Son, Jos. T.

Curtains, Cab.
Lehon Co., The.

Cutting and Welding Apparatus.
Oxweld Railroad Service Co.
Westinghouse Electric & Mfg. Co.

Cut-Off Indicators and Recorders.

Cylinder Parts, Finished and Rough.
Locomotive Finished Material Co.
National Tube Co.
Valve Pilot Co.

Cylinders, Air Brake.
Westinghouse Air Brake Co.

Cylinders, Cast Steel Locomotive.
General Steel Castings Corp.
Union Steel Casting Co.

Cylinders, Locomotive.
Locomotive Finished Material Co.

Cylinders, Oxy-Acetylene.
Oxweld Railroad Co., The.

Deoxidizers.
Q & C Co., The.
Vanadium Corp. of America.

Derricks.
Industrial Brownhoist Corp.

Diesel Electric Power Plants.
Fairbanks-Morse & Co.
Westinghouse Elec. & Mfg. Co.

Dirt Collectors.
New York Air Brake Co.
Westinghouse Air Brake Co.

Disinfectants.
West Disinfecting Co.

Dispatching Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Ditching Machinery.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Door Fixtures — (See Fixtures, Car Door).

Doors, Car.
Camel Sales Co.
Chicago Railway Equipment Co.
Miner, W. H.
Wine Railway Appliance Co.

Doors, Locomotive Firebox.
Franklin Railway Supply Co., Inc.

Doors, Rolling, Steel.
Kinnear Mfg. Co.

Draft Arms.
American Steel Foundries.
Birdsboro Steel Foundry & Machine Co.
Bradford Corporation.
Symington Co., The.
Universal Draft Gear Attachment Co.

Draft Gear Attachments.
Symington Co., The.

Draft Gears.
American Steel Foundries.
Bradford Corporation.
Cardwell-Westinghouse Co.
Edgewater Steel Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
National Malleable & Steel Castings Co.
Standard Coupler Co.
Union Draft Gear Co.
Universal Draft Gear Attachment Co.

Draft Yokes.
American Steel Foundries.
Bettendorf Co., The.
Buckeye Steel Castings Co.
Gould Coupler Co., The.
McConway & Torley Co.
Miner, W. H.
Mt. Vernon Car Mfg. Co.
National Malleable & Steel Castings Co.
Pressed Steel Car Co.
Steel Car Forge Co.
Symington Co., The.
Universal Draft Gear Attachment Co.

Drainage Gates, Automatic
Armco Culvert Mfrs. Assoc.
Republic Steel Corp.

Drains, Perforated Iron.
Republic Steel Corp.

Drawbar Centering Device.
Gould Coupler Co., The.
Miner, W. H.

Drawbars, Unit Safety.
Franklin Railway Supply Co., Inc.
Industrial Brownhoist Corp.

Dredging Machinery.
Industrial Brownhoist Corp.

Drilling Machines.
Sellers & Co., Inc., Wm.

Drilling Machines, Bonding.
Railroad Supply Co.

Drilling Machines, Pneumatic
Ingersoll-Rand Co.

Drilling Machines, Rock.
General Electric Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drilling Machines, Upright and Radial.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.

Drills.
Ingersoll-Rand Co.

Drills, Close Corner.
Ingersoll-Rand Co.

Drills, Concrete.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drills, Steel Rock and Steel Sharpened.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Drills, Track & Bending.
Bird-Archer Co., The.
Ingersoll-Rand Co.

Drive Gas Electric Coaches.
General Electric Co.

Drive Gas Electric Locomotives
Westinghouse Electric & Mfg. Co.

Driving Boxes (Extended Main).
Franklin Railway Supply Co., Inc.

Drop Door Mechanism.
Wine Railway Appliance Co.

Dynamos—(See Generators, Electric).

Electrical Cable Accessories.
General Electric Supply Corp.

Electric Cables.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Electrical Instruments.
Electric Service Supplies Co.
Railroad Supply Co.
Westinghouse Elec. & Mfg. Co.

Electrical Supplies.
General Electric Co.
General Electric Supply Corp.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Electrification, Railroad.
Battey & Kipp.
General Electric Co.
United Engineers & Constructors, Inc.
Westinghouse Elec. & Mfg. Co.

Electric Heaters.
General Electric Supply Corp.

Electrical Insulation.
General Cable Corp.
General Electric Supply Corp.

Electrical Porcelain Insulators.
General Electric Supply Corp.

Electric Motors.
General Electric Supply Corp.

Electric Rivet Heaters.
General Electric Supply Corp.

Electric Switches.
General Electric Supply Corp.

Enamels.
Lowe Bros. Co., The.
Sherwin-Williams Co.

End Frames, Cast Steel, Passenger Car.
General Steel Castings Corp.

Ends, Steel.
Hutchins Car Rfg. Co.
Union Metal Products Co.

Engineers, Consulting, Civil, Elec., Hydraulic, Mechanical.
Battey & Kipp.
Hunt Co., Robt. W.
Muhlfeld, John E.
United Engineers & Constructors, Inc.

Engineers, Contracting.
Battey & Kipp.
United Engineers & Constructors, Inc.

Engineers and Contractors.
Battey & Kipp.
Hunt Co., Robert W.
Murlfeld, John E.
United Engineers & Constructors, Inc.

Engineers, Construction.
Battey & Kipp.
Roberts & Schaefer Co.
United Engineers & Constructors, Inc.

Engineers and Contractors, Elec., Hydraulic, Mech.
Battey & Kipp.
Hunt Co., Robert W.
Muhlfeld, John E.
Roberts & Schaefer Co.

Engineers, Inspecting.
Gulick-Henderson Co.
Hunt Co., Robert W.
Muhlfeld, John E.
Pittsburgh Testing Laboratory.
United Engineers & Constructors, Inc.

Engineers, Valuation.
Hunt Co., Robert W.
United Engineers & Constructors, Inc.

Engines, Crude & Fuel Oil.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Engines, Diesel.
Worthington Pump & Machinery Corp.

Engines, Gas.
Brill Co., The J. G.
Worthington Pump & Machinery Corp.

Engines, Gas & Gasoline.
American Car & Foundry Motors Co.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Engines, Hoisting.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Excavators.
Industrial Brownhoist Corp.

Exhaust & Heater Pipe.
Union Asbestos & Rubber Co.

Exhaust & Ventilating Fans.
General Electric Supply Corp.

Expanders, Tube.
Ryerson & Son, Joseph T.

Fans, Exhaust & Ventilating.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Fasteners, Car Door.
Camel Sales Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
National Malleable & Steel Castings Co.

Feed Water Heater Systems.
Bird-Archer Co., The.
Coffin, Jr., Co., The J. S.
Worthington Pump & Machinery Corp.

Fencing Wire—(See Wire, Fence).

Fence Posts, Treated.
American Steel & Wire Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Ferro Alloys.
Vanadium Corp. of America.

Ferro, Chromium.
Vanadium Corp. of America.

Ferro, Molybdenum.
Electro Metallurgical Sales Corp.
Vanadium Corp. of America.

Ferro, Silicon.
Vanadium Corp. of America.

Ferro, Tungsten.
Vanadium Corp. of America.

Ferro, Vanadium.
Vanadium Corp. of America.

Filters, Air.
New York Air Brake Co.
Westinghouse Air Brake Co.

Filters, Water & Industrial.
Graver Tank & Mfg. Corp.

Filtration Plants (Water).
Graver Tank & Mfg. Corp.

Fireboxes.
American Locomotive Co.
Baldwin Locomotive Works.

Fire Fighting & Protection Equipment.
Johns-Manville Corp.

Fittings, Air Brakes.
Westinghouse Air Brake Co.

Fittings, Steam.
Vapor Car Heating Co., Inc.

Fixtures, Car Door.
Camel Sales Co.
Chicago Railway Equipment Co.
Miner, W. H.
National Malleable & Steel Castings Co.

Flangers, Snow.
Q & C Co., The.

Floodlights.
General Electric Supply Corp.
Graybar Electric Co.
Oxweld Railroad Service Co.
Pyle-National Co.
Symington Co., The.
Westinghouse Elec. & Mfg. Co.

Floodlights, Acetylene.
Oxweld Railroad Service Co., The.

Flooring.
Carey & Co., Philip, The.
Johns-Manville Corp.

Flooring, Car.
Tuco Products Corp.

Flooring, Coach.
Tuco Products Corp.

Flooring, Composition.
Johns-Manville Corp.
Tuco Products Corp.

Flooring, Treated.
Central Coal & Coke Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
National Lumber & Creosoting Co.

Floor Plates, Steel.
Carnegie Steel Co.
Illinois Steel Co.

Floor Slabs, Concrete.
American Cement Tile Mfg. Co.

Flue Cleaners—(See Cleaners, Flue).

Flue Cutters—(See Cutters, Flue).

Flues, Boiler—(See Tubes, Boiler).

Flue Shop Equipment.
Ryerson & Son, Joseph T.

Forges, Rivet Heating.
Ryerson & Son, Joseph T.

Forging Hammers.
Industrial Brownhoist Corp.

Forgings.
American Bridge Co.
American Steel Foundries.
Baldwin Locomotive Works, The.
Bethlehem Steel Co.

Brill Co., The J. G.
Carnegie Steel Co.
Edgewater Steel Co.
General Railway Signal Co.
Gould Coupler Co., The.
Illinois Steel Co.
Midvale Co., The.
Mt. Vernon Car Mfg. Co.
Neely Nut & Bolt Co.
Pressed Steel Car Co.
Standard Steel Works Co.
Steel Car Forge Co.
Universal Draft Gear Attachment Co.

Forgings, Drop.
Baldwin Locomotive Works, The.
Brill Co., The J. G.
General Railway Signal Co.
Steel Car Forge Co.
Union Switch & Signal Co.

Forgings, Monel Metal.
International Nickel Co., The.

Foundry Supplies.
Bird-Archer Co., The.

Frames, Cast Steel Locomotive
General Steel Castings Corp.

Frames, Locomotive.
American Steel Foundries.
American Locomotive Co.
Baldwin Locomotive Works.
Birdsboro Steel Foundry & Machine Co.
Ohio Steel Foundry Co., The.
Union Steel Casting Co.

Frames, Truck.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works
Bettendorf Co., The.
Birdsboro Steel Foundry & Machine Co.
Buckeye Steel Castings Co.
Brill Co., The J. G.
Franklin Railway Supply Co., Inc.
Gould Coupler Co., The.
Ohio Steel Foundry Co., The.
Pressed Steel Car Co.
Pyle-National Co.
Symington Co., The.

Frames, Vanadium.
American Locomotive Co.
Baldwin Locomotive Works
Birdsboro Steel Foundry & Machine Co.
Union Steel Casting Co.

Frogs and Crossings.
Bethlehem Steel Co.
Ramapo Ajax Corp.

Fulcrums, Brake Beam.
American Steel Foundries.
Brill Co., The J. G.
Chicago Railway Equipment Co.
National Malleable & Steel Castings Co.

Furnaces, Electric.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Furnaces, Gasoline.
Railroad Supply Co.

Furnaces, Rivet Heating—(See Forges, Rivet Heating).

Furniture.
Aluminum Co. of America.

Gage Testers—(See Testers, Gage).

Gages, Air.
Westinghouse Air Brake Co.

Gages, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Gages, Steam.
Ashton Valve Co.

Gages, Tire.
Schrader's Son, Inc., A.

Gages, Wheel Press Recording.
Ashton Valve Co.

Gaskets.
Westinghouse Air Brake Co.

Gasoline.
Ethyl Gasoline Corp.

Gear Blanks, Rolled Steel.
Edgewater Steel Co.
Standard Steel Works Co.

Gears and Pinions.
American Steel Foundries.
Westinghouse Elec. & Mfg. Co.

Gears, Silent.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gears, Valve — (See Valve Gears).

Generators, Acetylene.
Oxweld Railroad Service Co.

Generators, Car Lighting.
Safety Car Heating & Lighting Co.

Generators, Electric.
Fairbanks-Morse & Co.
General Electric Co.
Graybar Electric Co.
Sunbeam Electric Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Goggles, Welding.
Oxweld Railroad Service Co., The.
Sunbeam Electric Mfg. Co.

Graders, Elevating.
Western Wheeled Scraper Co.

Grapples, Wood.
Industrial Brownhoist Corp.

Grate Bars.
Q & C Co., The.

Grate Shakers, Automatic.
Franklin Railway Supply Co., Inc.

Grates.
Firebar Corp.

Grease Forming Machines.
Franklin Railway Supply Co., Inc.

Grey Iron.
American Brake Shoe & Foundry Co.

Grinders, Internal.
Micro Machine Co.

Grinders, Portable Crank Pin.
Micro Machine Co.

Grinding Machines.
Sellers & Co., Inc., Wm.

Grinding Machines, Portable.
Ingersoll-Rand Co.
Ryerson & Son, Inc., Joseph T.

Guard Rails, Treated.
Curtin-Howe Corp.
International Creosoting & Construction Co.

Guard Rails, Foot Guard.
Q & C Co., The.

Guard Rails (One Piece).
Bethlehem Steel Co.
Ramapo Ajax Corp.

Guard Switch Point.
Q & C Co., The.

Guards, Cattle.
American Bridge Co.

Guards, Dust.
Gould Coupler Co., The.
Symington Co., The.

Hair Felt.
Johns-Manville Corp.

Hammers, Pneumatic.
Ingersoll-Rand Co.

Hammers, Riveting.
Ingersoll-Rand Co.

Hammers, Steam.
Industrial Brownhoist Corp.
Sellers & Co., Inc., Wm.

Hand Brakes—(See Brakes, Hand).

Hangers, Ball Bearing.
S. K. F. Industries, Inc.

Hand Rails & Fittings.
Aluminum Co. of America.

Hangers, Bottom Rod Safety.
Chicago Railway Equipment Co.

Hangers, Car Door—(See Fixtures, Car Door).

Headgates, Sliding
Armco Culvert Manufacturers Association

Headlight Repair Parts, Electric.
Electric Service Supplies Co.
Pyle-National Co.
Sunbeam Electric Mfg. Co.

Headlights, Electric.
General Electric Co.
Pyle-National Co., The.
Sunbeam Electric Mfg. Co.
Westinghouse Electric & Mfg. Co.

Headlights, Reflectors & Cases.
Pyle-National Co.
Sunbeam Electric Mfg. Co.

Heaters, Electric.
Gold Car Heating & Lighting Co.
Westinghouse Electric & Mfg. Co.

Heaters, Feedwater.
Graver Tank & Mfg. Corp.

Heaters, Feedwater Locomotive.
Coffin Co., Jr., The J. S.
Superheater Company, The.
Worthington Pump & Machinery Corp.

Heaters, Feed Water, Stationary.
Brill Co., The J. G.
Worthington Pump & Machinery Corp.

Heating & Ventilating Apparatus.
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Westinghouse Electric & Mfg. Co.

Heating Equipment, Car.
Gold Car Heating & Lighting Co.
Safety Car Htg. & Ltg. Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

Heating Systems, Car (Electric and Steam).
Gold Car Heating & Lighting Co.
Safety Car Htg. & Ltg. Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

High Temperature Cements.
Carey & Co., Philip, The.

Highway Crossing Protection Devices.
American Bridge Co.
Franklin Railway Supply Co., Inc.
Griswold Signal Co.
Railroad Supply Co.

Hoists, Chain.
Milwaukee Electric Crane & Hoist Corp.
Ryerson & Son, Jos. T.

Hoists, Electric.
Milwaukee Electric Crane & Hoist Corp.

Hoists, Pneumatic.
Ingersoll-Rand Co.

Hoists, Second-Hand.
Hyman-Michaels Co.

Hoisting Machinery.
Industrial Brownhoist Corp.
Milwaukee Electric Crane & Hoist Corp.
Orton Crane & Shovel Co.

Hooks, Wrecking.
National Malleable & Steel Castings Co.

Horns, Pneuphonic.
Westinghouse Air Brake Co.

Hose, Air, Steam, Etc.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.
Worthington Pump & Machinery Corp.

Hose, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Hose, Tender.
Westinghouse Air Brake Co.

Incandescent Lamps.
General Electric Supply Corp.

Indicators, Speed & Cut-off.
Valve Pilot Co.

Ingots.
Birdsboro Steel Foundry & Machine Co.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
McConway & Torley Co.
Standard Steel Works Co.

Injectors, Exhaust Steam.
Sellers & Co., Inc., Wm.
Superheater Co., The.

Inspection of Material and Equipment—(See Engineers, Inspection).

Insulated Wire.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Insulation, Car.
Carey Co., Philip, The.

Insulation, Car, Bldg.
Carey Co., Philip, The.
JohnsManville Corp.
Lehon Co., The.
Tuco Products Corp.
Union Asbestos & Rubber Co.

Insulation, Electrical.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulation, Exhaust & Heater Pipe.
Carey Co., Philip, The.
Johns-Manville Corp.
Tuco Products Corp.
Union Asbestos & Rubber Co.

Insulation, Heat.
Carey Co., Philip, The.
Miner, W. H.

Insulation Tape.
General Electric Supply Corp.

Insulators, Electrical, Porcelain.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Interlocking Plant Equipment.
General Railway Signal Co.
Union Switch & Signal Co.

Iron Chain.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Charcoal.
Bethlehem Steel Co.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Engine Bolt.
Lockhart Iron & Steel Co.
Logan Iron & Steel Co.
Ryerson & Son, Joseph T.

Iron, Forging Billets.
Lockhart Iron & Steel Co.
Logan Iron & Steel Co.

Iron, Hollow Staybolt.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron, Hollow Staybolt Bars.
Bethlehem Steel Co.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron, Pig.
Bethlehem Steel Co.

Iron, Refined.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Reading Iron Co.
Ryerson & Son, Joseph T.

Iron, Staybolt — (See also Staybolts).
Ewald Iron Co.
Falls Hollow Staybolt Co.
Lockhart Iron & Steel Co.
Logan Iron & Steel Co.
Reading Iron Co.
Ryerson & Son, Joseph T.

Jacking, Locomotive.
Carey Co., Philip, The

Jacking Method of Installing Pipe
Armco Culvert Manufacturers Association

Jacks, Smoke.
Carey Co., Philip, The.
Johns-Manville Corp.

Joints, Air Reservoir.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Blow Off Line (Roundhouse).
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Coach and Coach Yard.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Joints, Flexible.
Franklin Railway Supply Co., Inc.
Vapor Car Heating Co., Inc.

Joints, Flexible Ball.
Barco Mfg. Co.

Joints, Rail.
American Steel Foundries.
Carnegie Steel Co.
Illinois Steel Co.
Q & C Co., The.
Rail Joint Co.
Union Switch & Signal Co.

Joints, Steam, Air & Liquid.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.
Vapor Car Heating Co., Inc.

Joints, Swing.
Barco Mfg. Co.
Vapor Car Heating Co., Inc.

Journal Boxes and Lids.
Allegheny Steel Co.
American Steel Foundries.
Brill Co., The J. G.
Gould Coupler Co., The.
Hunt-Spiller Mfg. Corp.
National Malleable & Steel Castings Co.
Pullman Car & Mfg. Corp.
Railway Steel Spring Co.
Symington Co., The.
Union Spring & Mfg. Co.

Journal Oilers, Car & Locomotive.
Ardco Mfg. Co.

Keys, Brake Shoe.
Bradford Corporation.
Mt. Vernon Car Mfg. Co.
Steel Car Forge Co.
Union Spring & Mfg. Co.

Knuckles, Emergency.
Q & C Co., The.

Laboratories, Testing.
Hunt Co., Robert W.
Pittsburgh Testing Laboratory.

Lacquers.
General Electric Supply Corp.
Sherwin-Williams Co.

Ladders, Steel Car.
Wine Railway Appliance Co.

Lagging, Locomotive.
Carey & Co., Philip, The.
Johns-Manville Corp.

Lamps, Incandescent.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Inspector's.
Oxweld Railroad Service Co., The.

Lath, Metal.
Armco Railroad Sales Co.

Lathes, Axle.
Sellers & Co., Inc., Wm.

Lathes, Engine.
Ryerson & Son, Joseph T.

Lathes, Wheel.
Sellers & Co., Inc., Wm.

Lead, White.
National Lead Co.

Lighting Equipment, Car.
Electric Storage Battery Co.
Safety Car Htg. & Ltg. Co.

Lighting Fixtures and Systems.
General Electric Supply Corp.
Graybar Electric Co.
Pyle-National Co.
Safety Car Htg. & Ltg. Co.

Lighting Plants, Gas, Electric
Pyle-National Co., The.
Sunbeam Electric Mfg. Co.

Lightning Arresters.
General Electric Supply Corp.

Line Material.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Lock Nuts—(See Nut Locks)

Locomotive Jacket Sheets.
Armco Railroad Sales Co.

Locomotive Water Conditioners
Bird-Archer Co., The.

Locomotives, Contractors.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Electric.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Locomotives, Gasoline.
Baldwin Locomotive Works.

Locomotives, Gas-Electric.
Brill Co., The J. G.
Electro-Motive Co.

Locomotives, Geared.
Lima Locomotive Works.

Locomotives, Industrial.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.
Westinghouse Elec. & Mfg. Co.

Locomotives, Mine.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.
Westinghouse Elec. & Mfg. Co.

Locomotives, Oil Engine, Electric Driven.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.
Whitcomb Locomotive Co., The.

Locomotives, Rebuilt.
American Locomotive Co.

Locomotives, Repair Parts.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Second-Hand.
Hyman-Michaels Co.

Locomotives, Steam.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotive Stokers.
Standard Stoker Co.

Locomotive Valve Pilot.
Valve Pilot Co.

Lubricators, Driving Box.
Franklin Railway Supply Co., Inc.

Lubricators, Piston Rod.
Q & C Co., The.

Lumber, Asbestos.
Carey & Co., Philip, The.
Johns-Manville Corp.

Lumber, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
Industrial Lumber & Creosoting Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Machinery, Hydraulic.
Birdsboro Steel Foundry & Mach. Co.

Machine Screws, Monel Metal
International Nickel Co., The.

Magnets, Lifting.
Industrial Brownhoist Corp.
Electro Metallurgical Sales Corp.

Mechanical Draft Apparatus—(See Heating and Vent. App.).

Mechanical Stokers.
Standard Stoker Co.

Melters, Snow, Electric.
Q & C Co., The.

Metallic Flexible Conduit.
General Electric Supply Corp.

Meters, Water & Oil.
Worthington Pump & Machinery Corp.

Milling Machines, Planer Type.
Sellers & Co., Inc., Wm.

Milling Machines, Plain and Universal.
Ryerson & Son, Joseph T.

Milling Machines, Portable Frame Jaw.
Micro Machine Co.

Mohair Upholstery Velvets.
Chase & Co., L. C.
Massachusetts Mohair Plush Co.

Molybdenum Metal.
Vanadium Corp. of America.

Monel Metal, Rods, Sheets, Tubes, Wire, etc.
International Nickel Co., The.

Motors, Electric.
Fairbanks-Morse & Co.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co

Motors & Generators.
Fairbanks-Morse & Co.

Moulding.
Aluminum Co. of America.

Multiple V Belt Drives.
Worthington Pump & Machinery Corp.

Nails.
American Steel & Wire Co.
Reading Iron Co.
Ryerson & Son, Joseph T.

Nipples, Air Hose.
Prime Manufacturing Co.

Nozzles, Exhaust.
Franklin Railway Supply Co., Inc.

Nozzles, Oxy-Acetylene Cutting.
Oxweld Railroad Service Co., The.

Nuts—(See Bolts and Nuts).

Nut Locks.
Dardelet Threadlock Corp.
Grip Nut Co.

Nuts, Tank Hose.
Prime Manufacturing Co., The.

Office Appliances.
Remington-Rand Business Service.

Oil-Electric Locomotives.
American Locomotive Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.

Oil Filtering & Storage Systems.
Graver Tank & Mfg. Corp.

Oil, Linseed.
National Lead Co.

Oil Plugs, Steam Chest.
Franklin Railway Supply Co., Inc.

Oxy-Acetylene Apparatus.
Oxweld Railroad Service Co., The.

Oxygen.
Oxweld Railroad Service Co., The.

Packing.
Westinghouse Air Brake Co.

Packing, Air Pump.
Johns-Manville Corp.
Pilot Packing Co.
Union Asbestos & Rubber Co.
Westinghouse Air Brake Co.

Packing, Asbestos.

Packing, Cylinder and Valve Ring.
Johns-Manville Corp.
Hunt-Spiller Mfg. Corp
Locomotive Finished Material Co.
Westinghouse Air Brake Co.

Packing, Locomotive Cab Cock.
Johns-Manville Corp.
Union Asbestos & Rubber Co.

Packing, Ring Boiler.
Union Asbestos & Rubber Co.

Packing, Semi-Metallic.
Pilot Packing Co.
Central Alloy Steel Corp.

Packing, Sheet.
Johns-Manville Corp.
Union Asbestos & Rubber Co.

Packing, Soft.
Carey & Co., Philip, The.
Johns-Manville Corp.
Pilot Packing Co.
Union Asbestos & Rubber Co.

Packing, Throttle.
Johns-Manville Corp.
Union Asbestos & Rubber Co.

Packing Valve Stem.

Paint Burners, Acetylene.
Oxweld Railroad Service Co., The.

Paint, Metal Protective.
Lowe Bros. Co., The.
National Lead Co.
Sherwin-Williams Co.

Paint, Powder.
Aluminum Co. of America.

Paint Spraying Equipment.
De Vilbiss Mfg. Co., The.

Paints.
Lowe Bros. Co., The.
National Lead Co.
Sherwin-Williams Co.

Paper, Carbon.
Remington-Rand Business Service.

Paper, Sheathing.
Carey & Co., Philip, The.

Patterns, for Iron, Steel & Brass Castings.
Baldwin Locomotive Works, The.

Pavement Breakers.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Pickling Equipment, Monel Metal.
International Nickel Co., The.

Pile Drivers.
Industrial Brownhoist Corp.
Orton Crane & Shovel Co.

Piling, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Piling, Sheet Steel.
American Bridge Co.
Carnegie Steel Co.

Pilot Beams, Cast Steel.
General Steel Castings Corp.
Gould Coupler Co., The.

Pilots, Cast Steel.
General Steel Castings Corp.
Locomotive Finished Material Co.

Pins, Air Brake & Clevis.
Champion Rivet Co.

Pins, Center.
Miner, W. H.

Pins, Coupler Knuckle.
Champion Rivet Co.
McConway & Torley Co.
National Malleable & Steel Castings Co.

Pins, Crank.
American Locomotive Co.
Baldwin Locomotive Works.
Miner, Inc., W. H.
Standard Steel Works Co.
Union Asbestos & Rubber Corp.

Pipe, Corrugated Iron
Armco Culvert Manufacturers Association

Pipe, Paved Invert
Armco Culvert Manufacturers Association

Pipe Coverings.
Carey & Co., Philip, The.
Johns-Manville Corp.
Keasby & Mattison Co.

Pipe Fittings—(See Fittings, Pipe).

Pipe, Metal Culvert.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Republic Steel Corp.

Pipe, Perforated Iron
Armco Culvert Manufacturers Association

Pipe, Spiral Welded.
Armco Railroad Sales Co.

Pipe, Steel Signal.
National Tube Co.

Pipe, Spiral Welded.
Armco Railroad Sales Co.

Pipe, Wrought Iron.
Byers Co., A. M.
Reading Iron Co.

Planers, Plate.
Ryerson & Son, Jos. T.
Sellers & Co., Inc., Wm.

Plates.
Steel Car Forge Co.

Plates, Follower.
Steel Car Forge Co.

Plates, Boiler, Firebox—(See Steel Firebox).

Plates, Center—(See Bearings, Center).

Plates, Iron & Steel.
Armco Railroad Sales Co.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Plate & Sheet Metal Work.
Baldwin Locomotive Works, The.

Plates, Tie.
Illinois Steel Co.
Inland Steel Company.
Railroad Supply Co.
Tennessee Coal, Iron & Railroad Co.

Plates, Tin and Terne.
American Sheet & Tin Plate Co.

Platforms, Car.
Gould Coupler Co., The.
Standard Coupler Co.

Platforms, Cast Steel, Passenger Car.
General Steel Castings Corp.

Plows, Railroad and Grading.
Western Wheeled Scraper Co.

Plows, Snow.
American Locomotive Co.
Brill Co., The J. G.
Q & C Co., The.

Plush, Mohair.
Chase & Co., L. C.
Massachusetts Mohair Plush Co.

Pneumatic Tools.
Ingersoll-Rand Co.

Poles, Signal.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
General Railway Signal Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.
Union Switch & Signal Co.

Poles, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
General Electric Supply Corp.
Curtin-Howe Corp.
Graybar Electric Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Poles, Steel Tubular.
Graybar Electric Co.
National Tube Co.

Posts, Fence, Treated.
Century Wood Preserving Co.
Curtin-Howe Corp.
Inland Steel Co.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Posts, Steel Fence.
American Steel & Wire Co.
Q & C Co., The.

Powder, Blasting—(See Explosives).

Powdered Coal Equipment.
Muhlfeld, John E.

Power Plants.
General Electric Co.
Muhlfeld, John E.
United Engineers & Constructors, Inc.
Westinghouse Elec. & Mfg. Co.

Power Transmission Supplies.
Sellers & Co., Inc., Wm.

Preservatives, Wood.
Century Wood Preserving Co.
Curtin-Howe Corp.
National Lumber & Creosoting Co.

Presses, Flanging Hydraulic.
Birdsboro Steel Foundry & Machine Co.

Presses, Hydraulic.
Baldwin-Southwark Corp.
Birdsboro Steel Foundry & Machine Co.

Presses, Wheel.
Birdsboro Steel Foundry & Machine Co.
Sellers & Co., Inc., Wm.

Pulverizers, Coal — (See Crushers, Coal).

Pumping Stations.
Fairbanks-Morse & Co.

Pump Liners, Monel Metal.
International Nickel Co., The.

Pump Rods, Monel Metal.
International Nickel Co., The.

Pump Shafts, Monel Metal.
International Nickel Co., The.

Pumps, Hydraulic.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Pumps & Pumping Mchy.
Fairbanks-Morse & Co.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.
Worthington Pump & Machinery Corp.

Pumps, Vacuum.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Punching and Shearing Machines.
Ryerson & Son, Joseph T.

Pushers, Coal.
Standard Stoker Co.

Pyrometers, Superheated Steam.
Superheater Co., The.

Rail Anchors.
Bethlehem Steel Co.
P. & M. Co., The.

Rail-Bonds.
American Steel & Wire Co.
General Electric Co.
General Railway Signal Co.
Graybar Electric Co.
Railroad Supply Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Rail Braces — (See Braces, Rail).

Rail Reclamation Equipment.
Ryerson & Son, Joseph T.

Railroad Shops.
United Engineers & Constructors, Inc.

Rail Splice Plates — (See Joints, Rail).

Railroad Structures — (See Engineers and Contractors; also Building).

Rails.
Bethlehem Steel Co.
Carnegie Steel Co.
Hyman-Michaels Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Inc., Joseph T.
Tennessee Coal, Iron & Railroad Co.
Thomson Rail Corp.

Rails, Relaying.
Hyman-Michaels Co.

Railway Signals.
General Electric Supply Corp.

Rattan.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Receivers, Air.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.

Recorders, Speed & Cut-off.
Valve Pilot Co.

Rectifiers for Signal Work.
General Electric Co.
Railroad Supply Co.
Union Switch & Signal Co.

Reducing Valves.
Vapor Car Heating Co., Inc.

Reflectors, Headlight.
Pyle-National Co., The.
Sunbeam Electric Mfg. Co.

Refrigerators.
Wine Railway Appliance Co.

Regulators, Oxy-Acetylene.
Oxweld Railroad Service Co., The.

Relays.
General Railway Signal Co.
Railroad Supply Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co

Removers, Paint & Varnish.
Oakite Products, Inc.

Repair Parts, Stoker.
Standard Stoker Co.
Q & C Company, The.

Retorts, Creosoting.
Graver Tank & Mfg. Corp.

Reverse Gear, Power.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Ringers, Bell
Hammett, H. S.

Rivet Cutters.
Ingersoll-Rand Co.

Riveters, Hydraulic.
Birdsboro Steel Foundry & Machine Co.

Riveting Machines.
Ingersoll-Rand Co.

Rivets.
Inland Steel Co.
Neely Nut & Bolt Co.
Ryerson & Son, Joseph T.
Pressed Steel Car Co.
Russell, Burdsall & Ward Bolt and Nut Co.

Rods.
Neely Nut & Bolt Co.

Rolled Steel.
Carnegie Steel Co.

Roller Bearings—(See Bearings, Roller).

Rolls, Bending & Straightening.
Birdsboro Steel Foundry & Machine Co.

Roof Slabs, Concrete.
Federal American Cement Tile Co.

Roofing, Asbestos.
Carey & Co., Philip, The.
Johns-Manville Corp.
Lehon Co., The.

Roofing, Buildings.
Armco Railroad Sales Co.
Carey Co., Philip, The.
Lehon Co., The.
Johns-Manville Corp.
Sunerior Sheet Steel Co., The (Division of Continental Steel Corp.).

Roofing, Car.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Carey & Co., Philip, The.
Hutchins Car Rfg. Co.
Johns-Manville Corp.
Lehon Co., The.
Superior Sheet Steel Co., The (Division of Continental Steel Corp.).
Tuco Products Corp.
Union Metal Products Co.

Roofing, Corrugated.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Carey Co., Philip, The.
Johns-Manville Corp.

Roofing, Tile.
Federal American Cement Tile Co.

Roofing, Tile, Cement.
Federal American Cement Tile Co.

Roofing, Tin.
American Sheet & Tin Plate Co.

Rope, Wire — (See Wire Rope).

Rust Preventatives.
Dearborn Chemical Co.
Oakite Products, Inc.

Safe Ends.
National Tube Co.

Sand Drying Plants.
Roberts & Schaefer Co.

Sanitary Products.
West Disinfecting Co.

Sash Balances.
Tuco Products Co.

Saws, Circular Metal.
Ryerson & Son, Joseph T.

Saws, High Speed, Friction.
Ryerson & Son, Joseph T.

Saws, Portable Rail.
Industrial Brownhoist Corp.
Q & C Co., The.

Scales.
Fairbanks-Morse & Co.

Scrapers, Wheeled and Drag.
Western Wheeled Scraper Co.

Screens, Passenger Car.
Tuco Products Corp.

Seats, Car.
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Seats, Coach.
Brill Co., The J. G.

Shafting.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.
Standard Steel Works Co.

Shapers.
Ryerson & Son, Joseph T.

Shapes, Pressed Steel.
Pressed Steel Car Co.
Sellers & Co., Inc., Wm.

Shapes, Structural.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sheds, Train.
American Bridge Co.
Inland Steel Co.

Sheets, Black and Galvanized.
Allegheny Steel Co.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Inland Steel Co.
Republic Steel Corp.
Ryerson & Son, Joseph T.

Sheets, Blue Annealed.
Allegheny Steel Co.

Sheets, Building, Special Car, Corrugated & Plain.
Armco Railroad Sales Co.

Sheets, Corrugated.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Carey Co., Philip, The.
Carnegie Steel Co.
Johns-Manville Corp.
Ryerson & Son, Joseph T.

Sheets, Corrugated & Plain.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sheets, Electrical.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Republic Steel Corp.
Ryerson & Son, Joseph T.

Sheets, Iron & Steel.
Armco Railroad Sales Co.
Bethlehem Steel Co.
Superior Sheet Steel Co., The (Division of Continetal Steel Corp.).

Sheets, Locomotive Jacket.
American Sheet & Tin Plate Co.
Armco Railroad Sales Co.
Inland Steel Co.
Ryerson & Son, Inc., Joseph T.

Sheets, Polished or Planished Iron.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.

Sheets, Steel.
Armco Railroad Sales Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Sherardising Plants.
General Electric Co.

Shop Calling Systems—(See Systems, Communication).

Shops, Railroad—(See Buildings, Iron, Steel and Steel Concrete).

Shovels & Draglines.
Industrial Brownhoist Corp.

Shovels, Steam, Gasoline & Electric.
Orton Crane & Shovel Co.

Siding, Iron & Steel.
Armco Railroad Sales Co.

Siding., Bldg., Car, Corrugated & Plain.
Kinnear Mfg. Co.
Armco Railroad Sales Co.
American Sheet & Tin Plate Co.
Inland Steel Co.
Ryerson & Son, Inc., Joseph T.

Siding, Corrugated & Plain.
Carey & Co., Philip, The.
Johns-Manville Corp.

Signal Accessories.
Electric Storage Battery Co.
General Electric Co.
General Railway Signal Co.
Graybar Electric Co.
Railroad Supply Co.
Union Switch & Signal Co.
Westinghouse Elec. & Mfg. Co.

Signals, Automatic Cab.
General Railway Signal Co.
Union Switch & Signal Co.

Signal Blades.
General Railway Signal Co.
Union Switch & Signal Co

Signals, Crossing.
Union Switch & Signal Co.

Signals, Crossing Protection.
General Railway Signal Co.
Railroad Supply Co.

Signals, Railway.
General Electric Co.
Union Switch & Signal Co.

Sign Posts, Treated.
Century Wood Preserving Co.
National Lumber & Creosoting Co.

Signs, Highway Crossing.
Railroad Supply Co.

Silico Manganese.
Vanadium Corp. of America.

Slabs, Concrete Floor.
Federal Cement Tile Co.

Slag, Blast Furnace.
Carnegie Steel Co.

Slotting Machines.
Sellers & Co., Inc., Wm.

Slotting Machines, Locomotive Cylinder.
American Steel & Wire Co.

Sludge Removers.
Bird-Archer Co., The.

Soap, Liquid.
West Disinfecting Co.

Solder.
National Bearing Metals Corp.
Ryerson & Son, Inc., Joseph T.
Westinghouse Elec. & Mfg. Co.

Speed Indicators & Recorders.
Valve Pilot Corp.

Spelter—(See Zinc).

Spikes.
American Steel & Wire Co.
Bethlehem Steel Co.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Splice Bars, Angle.
Carnegie Steel Co.
Illinois Steel Co.
Inland Steel Co.

Spring Plates or Seats.
Allegheny Steel Co.
National Malleable & Steel Castings Co.
Union Spring & Mfg. Co.

Springs.
American Steel Foundries Co.
American Steel & Wire Co
Baldwin Locomotive Works, The.
Pittsburgh Spring & Steel Co.
Railway Steel Spring Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.
Union Switch & Signal Co.

Springs, Shop Equipment.
Ryerson & Son, Joseph T.

Springs, Vanadium Steel.
Pittsburgh Spring & Steel Co.
Union Spring & Mfg. Co.

Stacks, Steel.
American Bridge Co.
Graver Tank & Mfg. Corp.

Stands, Switch & Target.
Q & C Co., The.

Staybolts.
American Locomotive Co.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Staybolts, Hollow.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Steam Chests.
Franklin Railway Supply Co., Inc.

Steam Enclosures, Corrugated Iron.
Republic Steel Corp.

Steam Shovels.
Orton Crane & Shovel Co.

Steel Alloy.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Republic Steel Corp.
Standard Steel Works Co.

Steel, Firebox.
Carnegie Steel Co.
Illinois Steel Co.

Steel & Iron, Stainless.
Allegheny Steel Co.

Steel, Open Hearth.
Carnegie Steel Co.
Illinois Steel Co.

Steel Plate Construction.
Graver Tank & Mfg. Corp.

Steel, Pressed Specialties.
Hale-Kilburn Co.

Steel, Structural.
American Bridge Co.
Carnegie Steel Co.
Graver Tank & Mfg. Corp.
Illinois Steel Co.
Inland Steel Co.
Ryerson & Son, Joseph T.

Steel, Tool.
Illinois Steel Co.
Midvale Co., The.
Q & C Co., The.
Ryerson & Son, Joseph T.

Step Joints.
Q & C Co., The.
Rail Joint Co.

Steps, Car—(See Car Steps, Safety).

Stokers, Locomotive.
Standard Stoker Co.

Stokers, Mechanical.
Westinghouse Elec. & Mfg. Co.

Stoker Repair Parts.
Standard Stoker Co.

Storm Sewers, Corrugated Iron.
Republic Steel Corp.

Strainer, Air.
Westinghouse Air Brake Co.

Strainers, Tank Hose.
Prime Mfg. Co., The.

Stringers, Bridge, Treated.
American Creosoting Co.
Central Coal & Coke Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Structural Shapes, Rolled Shapes.
Carnegie Steel Co.

Superheaters.
Superheater Co., The.

Supports, Bottom Rod Safety
Chicago Railway Equipment Co.

Switch Boards.
Graybar Electric Co.
Johns-Manville Corp.
Westinghouse Elec. & Mfg. Co.

Switch Machines.
General Railway Signal Co.

Switch Movements.
Union Switch & Signal Co.

Switch Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Switches, Electric.
Electric Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Westinghouse Elec. & Mfg. Co.

Switches & Switch Stands.
Ramapo Ajax Corp.

Syphons, Corrugated Iron.
Republic Steel Corp.

Syphons, Locomotive.
Locomotive Firebox Co.

Syphons, Locomotive, Bottom
Locomotive Firebox Co.

Tables, Welding.
Oxweld Railroad Service Co., The.

Tables, Welding.
Oxweld Railroad Service Co., The.

Tamping Machines, Tie.
Ingersoll-Rand Co.

Tamping Outfits, Tie.
Ingersoll-Rand Co.

Tank Cars.
Indian Refining Co.

Tanks, Acetylene, Gas.
Oxweld Railroad Service Co., The.

Tanks, Air, Gas, Oil and Water.
Baldwin Locomotive Works, The.
Graver Tank & Mfg. Corp.

Tanks, Water.
American Bridge Co.
American Locomotive Co.
National Tube Co.
Pressed Steel Car Co.
Westinghouse Air Brake Co.

Tape, Insulation.
Johns-Manville Corp.
Okonite Co., The.
Westinghouse Elec. & Mfg. Co.

Taps, Staybolt.
Ryerson & Son, Joseph T.

Tele. & Tele. Wire.
American Steel & Wire Co.
Anaconda Wire & Cable Co.
General Electric Supply Corp.

Terminals, Railroad.
United Engineers & Constructors, Inc.

Testers, Boiler.
Sellers & Co., Inc., Wm.

Testers, Gage.
Ashton Valve Co.

Testers, Rail.
Sperry Products, Inc.

Testers, Staybolt.
Flannery Bolt Co.

Testing Machines.
Baldwin-Southwark Corp.

Thermostats.
Gold Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.

Tie Plates.
Bethlehem Steel Co.
Illinois Steel Co.
Railroad Supply Co.

Ties, Creosoted.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Ties, Steel.
American Bridge Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Ties, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.
Southern Wood Preserving Co.

Tile, Cement, Concrete.
Federal American Cement Tile Co.

Timber, Treated.
Central Coal & Coke Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
National Lumber Co.
Southern Wood Preserving Co.

Tires.
Firestone Tire & Rubber Co.
General Tire & Rubber Co.
Goodyear Tire & Rubber Co.
Goodrich Rubber Co., B. F.

Timber, Treated.
American Creosoting Co.
Century Wood Preserving Co.
Curtin-Howe Corp.
International Creosoting & Construction Co.
National Lumber & Creosoting Co.

Tires, Steel.
Edgewater Steel Co.
Midvale Co., The.
Railway Steel Spring Co.
Standard Steel Works Co.

Toilet Papers
U. S. Envelope Co.

Tools, High Speed Steel.
Bethlehem Steel Co.
Bird-Archer Co., The.

Towers, Floodlight.
Pyle-National Co.

Track Skates.
Q & C Co., The.

Tractors.
Caterpillar Tractor Co.
Elwell-Parker Electric Co.
Industrial Lumber Co.
International Creosoting & Construction Co.

Tractors, Industrial.
Elwell-Parker Electric Co.
International Harvester Co.

Tractors, Turntable.
Nichols & Bro., Geo. P.

Train Control Systems.
General Railway Signal Co.
Union Switch & Signal Co.

Tramways, Wire Rope.
American Steel & Wire Co.

Transfer Tables.
American Bridge Co.
Industrial Brownhoist Corp.
Nichols & Bro., Geo. P.

Transformers.
General Electric Supply Corp.
Railroad Supply Co.
Westinghouse Elec. & Mfg. Co.

Trap Doors.
Edwards Co., O. M.

Trap Doors & Fixtures.
Tuco Products Corp.

Traps, Steam.
Johns-Manville Corp.

Treads, Bridge Floor.
Carnegie Steel Co.

Treads, Safety.
Ryerson & Son, Joseph T.

Treatment Water—(See Water Softening and Purifying).

Truck Frames—(See Frames, Truck).

Trucks, Oxy-Acetylene Supply.
Oxweld Railroad Service Co., The.

Trucks, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Bettendorf Company, The.
Birdsboro Steel Foundry & Machine Co.
Brill Co., The J. G.
Flexible Truck Co.
Franklin Railway Supply Co., Inc.
Gould Coupler Co.
Mt. Vernon Car Mfg. Co.
Pressed Steel Car Co.
Standard Car Truck Co.
Symington Co., The.

Trucks, Cast Steel Tender.
General Steel Castings Corp.

Trucks, Cast Steel, Electric Car.
General Steel Castings Corp.

Trucks, Cast Steel, Car and Locomotive.
General Steel Castings Corp.

Trucks, Electric Storage Battery.
Elwell-Parker Electric Co.

Trucks, Industrial.
Elwell-Parker Electric Co.

Trucks, Motor.
Dodge Motor Truck Corp.
General Motors Truck Co.
International Harvester Co.
Reo Motor Car Co.
White Co., The.

Trucks, Tender.
Flexible Truck Co.

Trucks, Trailer.
Brill Co., The J. G.
Franklin Railway Supply Co., Inc.

Tubes, Arch.
National Tube Co.

Tubes, Boiler.
Allegheny Steel Co.
Armco Railroad Sales Co.
Bethlehem Steel Co.
Globe Steel Tubes Co.
National Tube Co.
Ryerson & Son, Joseph T.

Tubes, Boiler, Charcoal Iron.
Bethlehem Steel Co.
Reading Iron Co.

Tubes, Staybolt.
Falls Hollow Staybolt Co.

Tubes, Tire.
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.

Tubing.
Aluminum Co. of America.

Tubing, Seamless Steel.
National Tube Co.

Tungsten Metal.
Vanadium Corp. of America.

Turbo Generators.
Electric Service Supplies Co.
General Electric Co.
Pyle-National Co.
Sunbeam Electric Mfg. Co.
Westinghouse Elec. & Mfg. Co.

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American Steel & Wire Co.
Ryerson & Son, Joseph T.

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Nichols & Bro., Geo. P.

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American Bridge Co.
Industrial Brownhoist Corp.
Nichols & Bro., Geo. P.

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Remington-Rand Business Service.

Uncoupling Device.
Hutchins Car Rfg. Co.

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Underfloor Duct.
General Electric Supply Corp.

Underfloor Duct, Fibre and Metal.
Johns-Manville Corp.

Underframes, Cast Steel, Tender.
General Steel Castings Corp.

Underframes, Cast Steel, Freight Car.
General Steel Castings Corp.

Underframes, Steel.
Bettendorf Co., The.
Brill Co., The J. G.
Pressed Steel Car Co.
St. Louis Car Co.

Underground Conduit.
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Chase & Co., L. C.
Massachusetts Mohair Plush Co.

Valve Caps.
Schrader's Son, Inc., A.

Valve Gears, Locomotive.
Pyle-National Co.

Valves, Air Brake.
Westinghouse Air Brake Co.

Valves, Back Pressure Acetylene.
Oxweld Railroad Service Co., The.

Valves, Balanced Slide
Hammet, H. G.

Valves, Blow-Off.
Bird-Archer Co., The.

Valves, Check & Angle Steam
Sellers & Co., Inc., Wm.

Valves, Drifting.
Ardco Mfg. Co.
Sellers & Co., Inc., Wm.

Valves, Hydraulic.
Birdsboro Steel Foundry & Machine Co.

Valves, Piston.
Franklin Railway Supply Co., Inc.

Valves, Pop, Safety & Relief.
Ashton Valve Co.
Vapor Car Heating Co., Inc.
Westinghouse Air Brake Co.

Valves, Pressure Regulating.
Gold Car Heating & Lighting Co.

Valves, Throttle.
American Throttle Co., Inc.
Bradford Corporation.

Valves, Fire.
Schrader's Son, Inc., A.

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Aluminum Co. of America.

Varnishes.
General Electric Supply Corp.
Lowe Bros. Co., The
Sherwin-Williams Co.
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Wine Railway Appliance Co.

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Gold Car Heating & Lighting Co.

Ventilators, Shop & Roundhouse.
Carey Co., Philip, The.
Johns-Manville Corp.

Wardrobes, Rolling and Disappearing Front — (See Lockers).

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Ryerson & Son, Joseph T.
Wine Railway Appliance Co.

Washers, Boiler.
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Waterproofing Materials and Compounds.
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Johns-Manville Corp.
Lehon Co., The.

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Bird-Archer Co., The.
Dearborn Chemical Co.
Graver Tank & Mfg. Corp.
Permutit Co., The.

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Tuco Products Corp.

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Franklin Railway Supply Co., Inc.

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American Steel Foundries.
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Hunt-Spiller Mfg. Corp.
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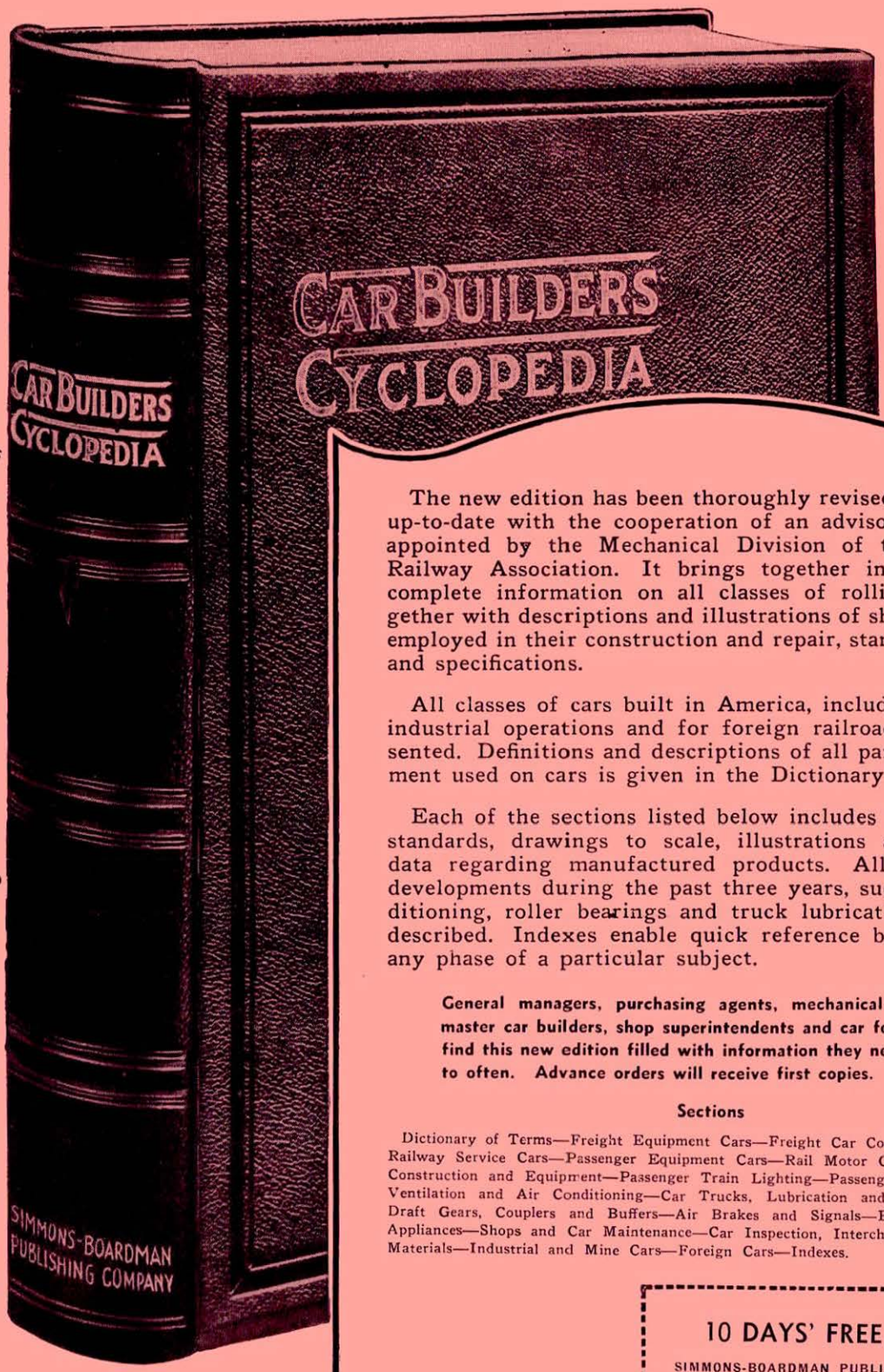

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